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Digitizing Chronic Care: Developing a New Service Model for Type 1 Diabetes Care

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2014 Otaniemi

Laurea University of Applied Sciences
Otaniemi

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Developing a New Service Model for Type 1 Diabetes Care

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Degree Programme
in Health Promotion
Master's Thesis
November, 2014

Laurea University of Applied Sciences **Abstract**
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Year 2014 Pages 115

The mid-nineties saw the beginning of eHealth development strategies in Finland. Since then, Finnish eHealth has evolved from a technological based to more client-centred services, enabling patients to take a more active role in their health management. The implementation of such strategies in Finland has been slow but eHealth has the potential to revolutionize healthcare strategies and create significant cost reductions.

The Satakunta Hospital District provides healthcare for some 80000 diabetes patients with diabetes care accounting for 15% of specialized medical care costs in the region. This study aimed to develop a client-driven service model for type 1 diabetes care in the Satakunta Hospital District to meet the challenges of an increasing number of diabetes patients vs a decreasing number of healthcare providers due to retirement as the year 2020 approaches.

Participation in CoCo Cosmos plays enabled healthcare professionals and patients from the Satakunta Hospital District to reflect upon the current healthcare process and propose more efficient eHealth strategies whereby the patient is a more active participant in their own care. Through the use of qualitative data analysis, an eHealth blueprint of a new client–driven service where eHealth was the main service channel, enabling a digitized, more flexible and efficient approach to healthcare and equalizing the patient/professional role in health services was formed from these suggestions.

The findings suggest that eHealth is as equal a service to patients as telephone and face to face visits for the patient and the blueprint developed in this study enabled the patient to actively participate in their self-care and plan their care around their everyday life. This could be seen as a means of maintaining a consistent approach and quality of service for type 1 diabetes patients in the Satakunta Hospital District in the near future as the number of health care professionals decreases.

The blueprint for eHealth integration created in this project could be implemented as a pilot project for type 1 diabetes patients in the future to test the effectiveness of the service. Further studies of how this type of solution reduces patients' visits, telephone encounters other interactions with healthcare providers would be beneficial to identify the usefulness of deploying this model to other non-communicable diseases in the future, thereby improving patient interaction and healthcare efficiency in other healthcare sectors in Finland.

Chronic Care Model, User-driven, Co-creation, Diabetes, Digitization, eHealth, Noncommunicable diseases, Patient engagement, Quality of Care, Self-care, Service Management

Laurea-ammattikorkeakoulu **Tiivistelmä**
Otaniemi
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Kroonisen hoidon digitalisointi: Uuden palvelumallin kehittäminen tyypin 1 diabeteksen hoitoon

Vuosi 2014 Sivumäärä 115

Suomessa kehitettiin ensimmäinen eTerveys strategia 1990-luvun puolivälissä. Siitä lähtien eTerveys palveluita on kehitetty teknologiavetoisesti kohti asiakaslähtöisiä palveluita ja ne mahdollistavat asiakkaan aktiivisen osallistumisen omahoitoon ja terveydentilan seurantaan. Asiakaslähtöisten omahoitopalveluiden käyttöönotto ja laajeneminen on tapahtunut hitaasti siitä huolimatta, että eTerveyden tuomat potentiaaliset säästöt ja terveyspalvelujen muutokset ovat huomattavat.

Satakunnan sairaanhoitopiiri tarjoaa terveyspalveluita noin 80000 diabetespotilaalle ja diabeteksen sekä lisäsairauksien hoidon arvioidaan olevan noin 15 % erikoissairaanhoidon kuluista. Tämän tutkimuksen tarkoituksena oli kehittää asiakaslähtöinen palvelumalli tyypin 1 diabeteksen hoitoon Satakunnan sairaanhoitopiirissä, jotta tulevaisuudessa voitaisiin tarjota palveluita diabetespotilaiden määrän kasvaessa ja hoitohenkilökunnan vähentyessä eläkepoistuman myötä vuoteen 2020 mennessä.

Moniammatillisen hoitotiimin jäsenet ja potilaat, tässä tutkimuksessa kokemusasiantuntijat, osallistuivat työpajoihin ja kuvasivat CoCo Kosmos pelin avulla nykytilan ja hahmottivat uuden eTerveyteen perustuvan palvelumallin, jossa asiakas on aktiivinen omahoidon toteuttaja. Laadullisen analyysin menetelmin kehitettiin asiakaslähtöinen palvelumalli ja suunnitelma, jossa eTerveys on pääasiallinen palvelukanava mahdollistaen digitalisoidun, joustavamman ja tehokkaamman terveydenhoidon sekä tasa-arvoistaen terveyspalvelujen asiakkaan ja ammattilaisen rooleja.

Tulokset ilmentävät, että eTerveys on potilaalle samanarvoinen palvelukanava kuin puhelin tai vastaanotto. Tutkimuksessa kehitetty suunnitelma osoittaa palvelun sallivan asiakkaan aktiivisen osallistumisen omahoitoon ja mahdollisuuden suunnitella hoito jokapäiväisen elämän lähtökohdista. Tämä tulkittiin keinoksi ylläpitää jatkuvia ja korkealaatuisia palveluita Satakunnan sairaanhoitopiirissä lähitulevaisuudessa henkilökunnan vähentyessä ja jäädessä eläkkeelle.

Tässä tutkimuksessa kehitetty integroitu eTerveys palvelumalli voidaan käyttöönottaa tyypin 1 diabeteksen hoidossa ja pilotoida sen vaikutuksia lähitulevaisuudessa. Jatkotutkimuksessa tulisi selvittää paljonko palvelumalli vähentää vastaanottokäyntejä, puhelinsoittoja ja muuta vuorovaikutusta terveyspalveluntarjoajan kanssa. Lisäksi olisi tarpeellista tunnistaa palvelumallin hyödyllisyys ja käytettävyys muiden ei-tarttuvien tautien hoidossa ja siten parantaa asiakkaan vuorovaikutusta ja terveyspalvelujen tehokkuutta terveydenhuollon toimintayksiköissä Suomessa.

Asiakaslähtöinen palvelu, Diabetes, Digitalisaatio, Hoidon laatu, Omahoito, Potilaan sitouttaminen, Sähköinen asiointi, Tarttumattomat taudit, Terveyshyötymalli, Yhteiskehittäminen

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1 Introduction

The first Finnish eHealth and eWelfare strategy was built around the principle of a citizen-centred, seamless service structure in 1996. The implementation of the strategy focused on technology, only partially on seamlessness, but did not address client-centred, active patient or health promotion. (Hyppönen, Hämäläinen, Kangas, Kärki, Laaksonen, Reponen & Winblad 2013, 30).

In the early 21st Century several pilot projects developed eHealth solutions for healthcare, such as Makropilotti in the Satakunta region and in the cities of Espoo, Oulu and Turku. The eKat in 2007-2009 was the first centrally coordinated and funded pilot project in Finland. It had five different regional pilot projects and three national eHealth definition projects. In the regional projects scheduling, communication, self-care and personal health record and quality information portal to citizens were developed. Additionally the project introduced definitions to the agreement and authorization process, national scheduling system and self-care eHealth architecture. (Koski, Niska & Valkeakari 2009, 9-12). The VTT FeelGood project 2008-2009 studied and developed ecosystems for personal health records. North Karelia Central Hospital, the Honkalampi Centre, the cities of Oulu, Espoo, Turku and several other cities have implemented eHealth services alongside the existing face-to-face services. (Hämäläinen, Reponen & Winblad 2012, 128). Several studies support that the eHealth services, like personal health record, motivate the clients and patients to take more responsibility for their own care plan. These services have the potential to revolutionize health promotion and disease management by improving the quality of intervention with considerable cost reductions. (Evers 2006, 2-3).

The health providers offer eHealth solutions to their clients, but the use of these services has been moderate in Finland and in Europe. The implementation and deployment of the eHealth solutions has been fairly slow. (Bujnowska-Fedak, Chronaki, Kummervold, Lausen, Rasmussen, Santana & Sorensen, 2010; Hämäläinen et al., 2012, 128; Lahtiranta & Koskinen, 2013, 88). The general assumption is that the hindrance is the lack of computer skills, especially with elderly people who do not use the Internet. This assumption is not true based on the statistics of the Internet users in Finland. The clients and the health professionals are willing to use eHealth in Finland. (Koski et al. 2009, 6-7; Tilastokeskus 2011, 9, 11).

The retrospective cohort study which Palen, Powers, Ross & Xu (2012) conducted had a large number of regular eHealth users. The study results showed that the use of a patient portal increased the use of clinical services such as doctor's appointments, telephone encounters and even acute care services, compared to the users without the access. These results were in conflict with those in earlier studies. The findings covered younger and elderly patients

with and without chronic illness. The authors pointed out that this large study showed the access and utilization of the patient portal is more complex than the simple substitution of in-person care to an eHealth solution. The authors discussed that it might be beneficial to tailor online services to users' needs and the health information systems should be integrated to the in-person care. (Palen, Powers, Ross & Xu 2012, 2012-2018).

Creation of the eHealth service system besides the traditional service system in the future is an extensive task. This requires the renewal of the service model and processes which will affect to the service system. (Ahopelto, Iivari, Hyppönen 2011, 46-48). The eHealth needs to be integrated to the care processes. This requires the development of policies and changes in the doctor-patient and nurse-patient relationship. (Dubbink 2013, 31). Digitization can be defined in a broader societal context as the economic and social transformation triggered by the adoption of digital technologies to generate, process, share and transact information. To achieve a substantial impact digitization has to be embraced at three levels: utilized by individuals, enterprises of private and public sector as well as societies, embedded in processes of production of goods and services, and relied upon to deliver public services. (Callorda, Katz & Koutroumpis 2014, 32-33).

The public services are often part of a large and complicated organization. The public services have grown organically over a long period of time. The systematic changes will not happen overnight and need work at all levels. The changes can create frustration because the capacity to create changes is limited. In the public sector the service design involves innovating within existing services rather than designing new services from scratch. The service design enables public services to understand the way their service is experienced and make changes based on this understanding. (Thurson 2009, 151-160).

The healthcare stakeholders' situation is changing as Figure 1 illustrates. The patients are stakeholders in making decisions about their own care or cure. (Aitken 2013, 3).

Figure 1. Evolution of Healthcare Stakeholders.
(Aitken 2013, 3).

A client participating in a co-creation process adds value because he/she is tailoring the good, service or product as he/she desires. The client is an active player in co-creation and adds value to the innovation process. Additionally co-creation can uncover latent or unarticulated needs. (Johansson, Kristiansson & Matthing 2008, 475-478). The usability of the service is ensured when the users can participate in the creation process. (Miettinen 2011, 21).

This study concentrated on the development process of the client-driven service where eHealth is the primary communication and connection channel with the client and health professionals. The study aimed to create a client-driven service to the care for type 1 diabetes patients in the Satakunta Hospital District. The client-driven service process was created using the service design approach. The clients and health professionals acted and worked together to create the experience of the eHealth service. The service was primarily based on electronic connection and interaction but the client had the possibility to meet the health professional based on his/her decision and needs.

In this study the approach was cross-disciplinary. The study combined service perspective with Chronic Care Model and eHealth in the theoretical framework as well as in practice when co-creating and documenting the new service model. The aim of this study was to develop a client-driven multi-channel service model for type 1 diabetes patients. The first phase was to deepen the knowledge of the subject and definitions through a comprehensive literature review. The literature review emphasized three theoretical frameworks: eHealth, Chronic Care Model and Service Design and Management. During the second phase workshops were planned and the new service model was co-created with innovative methods together with the participants. The CoCo Tool Kit was used in the co-creation workshops (Dusch, Keränen & Ojasalo 2013b, 19, 53). The third phase comprised the analysis of the collected data and documentation of the new service in a blueprint. Action research was evaluated as an appropriate method when the research question was related to developing and understanding the change and unfolding series of actions over time in an organization (Eriksson & Kovalainen 2010, 193-194).

In this study the re-organization of the work, treatment of diabetes, treatment of patients and implementing an eHealth solution were excluded.

2 Theoretical Concepts for the Study

This study has four theoretical concepts; eHealth, Chronic Care Model, Self-care and Service Design and Management which are referred to in the literature review in the following chapters.

2.1 eHealth Definitions and Earlier Studies

The potential benefits and savings of the use of eHealth solutions have been demonstrated in many pilot projects and studies. Since the early 2000s there have been many pilot projects where eHealth has been implemented in practice within Finland and globally. Many of them focused on a particular problem solved with an eHealth solution. Since the mid 2005s the pilot projects in Finland have been centrally coordinated and funded to expand the knowledge of these single projects and find and share the best practices of eHealth solutions in health care.

The general perception that people, especially the older population, do not use the internet is out of date. Finland is one of the leading countries in Europe to use the internet. In 2011 89 percent of Finns used the Internet and three out of four use it daily. The use of the Internet is increasing especially with elderly citizens. In 2001 over 80 percent of 55-64 year olds and 50 percent of 65-74 year olds used the Internet. Men and women are using it equally. Nearly 80 percent of the users use email, read the news and use services on the internet such as online banking services. (Tilastokeskus 2011, 9, 11). According to the Finnish eHealth projects the citizens are willing to use eService in health care (Koski et al. 2009, 6-7).

2.1.1 Definitions

The first study task was to deepen knowledge of the subject with a comprehensive literature review. The definitions; eHealth, telehealth and connected health were confusing therefore it was important to understand how these definitions differ from each other. The definitions are used differently depending on the speaker or the context. (The European Connected Health Alliance 2014, 3, 7-11).

eHealth has not a single recognized definition. The World Health Organization (2012) defines eHealth as the use of information and communication technologies for health. It supports the delivery of health services and management of health systems through electronic means. eHealth has been described as a channel to provide the right health information to the right person at the right time in a secure mode. (WHO 2012, 18). mHealth is seen as a

technological tool to enable services and information though mobile phones and handheld computers. It is seen as a complementary channel for eHealth. (WHO 2012, 79).

eHealth is seen as a technological tool to enable a process, function and/or service alongside health information on the Internet. The technology is viewed as a means to assist and enhance human activities. (Enkin, Jadad, Oh & Ritz 2005).

The Personal Health Record (PHR, ePHR) is a patient-controlled health record, a repository of data that the individual or caregiver manages. The PHR enables patients to become active participants in their own care. The PHR can include decision-support capabilities that assist patients in managing their chronic condition. (Ash, Bates, Overhage, Sands & Tang 2006, 122; Ashish, Bates, Johnston, Kaelberg & Middleton 2008, 730). Dubbink (2013) has presented several PHR definitions and different approaches in creating a functional PHR in his paper (Dubbink 2013, 30, 32-35).

Patient portal enables the patient to view his/her patient data from health provider's electronic health record (EHR) or electronic medical record (EMR), clinical summaries and laboratory or other test results and appointments. Some patient portals offer patients the possibility to keep up with their health diary or watch instructional videos about chronic illnesses. (Dubbink 2013, 33, 44-45, 53).

> "The terms telehealth and telemedicine both describe the use of technology to exchange information to improve a patient's health status" (Lusting 2012, 3).

The Telehealth and Telemedicine refer to a broader definition of remote health care. The American Telehealth Association has considered these terms to be interchangeable. Telemedicine improves patient outcomes by increasing access to care and medical information with the use of ICT. (American Telehealth Assiciation 2011; WHO 2010, 8).

Telemedicine is often considered to cover direct clinical services provided via ICT. Telemedicine covers definitions as tele-consultation, tele-expertise and remote monitoring. In telemedicine the patient and the doctor or nurse encounter each other online whereas in tele-expertise or tele-diagnosis a doctor or professional consult online with a colleague. Telehealth is considered to have a wider meaning than telemedicine. Telehealth covers the scope of health-related services like remote monitoring and health education via ICT. In remote monitoring the patient, relative or health professional collect measurements or results himself or via device and transfers them manually or by wireless data connection from the device to the doctor, clinician or nurse for interpretation. (Beard, Cristofini & Daigne 2010, 49-52; Lusting 2012, 3).

In order to distinguish personal health records, telemedicine and eHealth with personalized care, the definition of the latter was meaningful. Personalized care is a holistic, interdisciplinary approach where healthcare, nature and nurture are combined. The personalized care combines the usual health conditions and symptoms with genomic and biomarker testing, behavioral tracking and nutritional intake, exercise and sleep as well as evaluating and monitoring a person's environment. The personalized care enables a citizen-centric and wellness focused health service model exemplified through ICT solutions. (Iakovidis 2010, 70-76; Swan 2009, 494)

Connected health is seen as an umbrella description for the above mentioned. The definition is not only technical but includes the idea of efficiency, improved access and quality. The Connected health provides means for the individuals to take more control of his/her own chronic illness, health or fitness and at the same time connect online with their health providers and family members. (Cnossen 2009, 28-31; The European Connected Health Alliance 2014, 11).

In this study, the definition of 'eHealth' is as WHO (2012, 18, 79) and Enkin, Jadad, Oh & Ritz (2005) have defined. eHealth enables a new channel for the health care services. It is as equal service channel as phone and planned visits to the customer as well as to the health care provider. eHealth technology provides the means to digitize health services.

2.1.2 eHealth Projects and Earlier Studies

The health professionals are skilled in the use of computers and software. They use internet databases such as Kustannus Oy Duodecim's Terveysportti or health provider's intranet to search for reliable medical information. The Electronic Health Record is used in every hospital district and health center in Finland. The nurses and doctors use these systems in their daily work. Their skills in the use of computers, software and internet are good. (Hämäläinen et al. 2011, 33, 59).

Finland was one of the first countries to implement national eArchive and ePrescritpion systems. The national ePrescription system has been in operation since 2010. During the year 2013 all pharmacies, hospital districts and primary health centers electronic health records were integrated to the national ePrescription database and the private sector will be integrated during the year 2014. The implementation of the national archiving system, eArchive, is mandatory for public health providers in the year 2014 and for the private sector in 2015. The citizen and patients have secured access to view their personal information stored in these databases. (Hyppönen et al. 2013, 57-59).

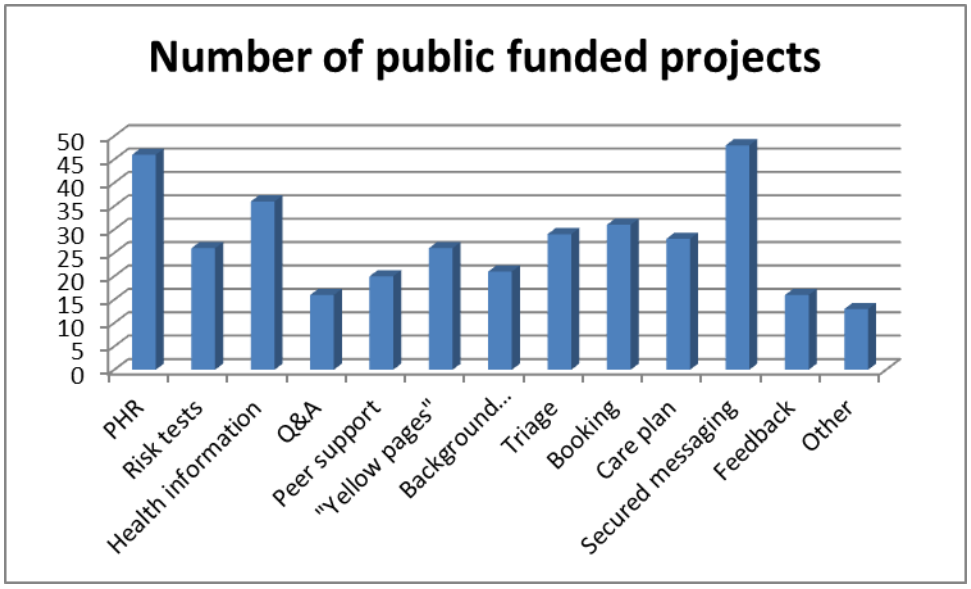

Table 1. The table shows the number of eHealth services developed in 75 different public funded projects in Finland.
(Ahopelto et al. 2011, 36).

Ahopelto et al. (2011) conducted a comprehensive review of eHealth pilot projects in Finland. A webropol questionnaire was conducted to survey projects with public funding in Finland which started in the year 2007 or after or was planned to start or started in the year 2010. These 75 health and social care eHealth projects focused on prompting patients with chronic illnesses to self-care with eHealth services, as shown in Table 1. The second aim was to develop and design new service processes. The survey showed the necessity to co-ordinate national projects and to share best practices. (Ahopelto et al. 2011, 4, 24, 49). Sitra funded a survey of eHealth diabetes projects done by the Nordic HealthCare Group. The survey presents interesting international and Finnish projects where the eHealth, self-care and service model of diabetes care were in focus. (Nordic Healthcare Group 2013, 2-13). The eHealth implementations and projects in Finland are presented in Appendix 1. These projects have been implemented Chronic Care Model, diabetes self-care or combined eHealth to health processes.

Earlier studies have showed eHealth may reduce the need of face-to-face appointments. Many of these earlier studies have had a small number of eHealth users and the study period had begun after the implementation of the eHealth service. Kaiser Permanente Colorado (KPCO) investigated the association between online services and medical services. KPCO launched online access to the patient's medical record, called MyHealthManager, in the year 2006. MyHealthManager (MHM) online service was a patient portal which had secured communication, non-urgent scheduling and the facility to request a refill of medication. The

members using the MHM increased steadily from 25 percent in the year 2005 to 53 percent (n= 375620) in the year 2009. The assumption in the study was that the use of MHM would decrease the need for face-to-face appointments. Palen, Powers, Ross & Xu (2012) conducted their study in KPCO between the years of 2005 and 2010. They compared two target groups: the users of MHM and non-users. The members of both target groups were adults and had continuously enrolled their health and care plan at least 24 months during the study period. There were 44000 members in each of these target groups. The results from the large retrospective cohort study differed considerably from earlier ones. The study showed that patients with several chronic illnesses did not use eHealth as an alternative to doctor's appointments but instead to gain support from the health professionals. (Palen et al. 2012, 2017-2018).

The city of Helsinki developed a care model of a multi-professional diabetes care team. The city analyzed how regularly the patients bring their self-care documentation, such as blood glucose values, to the appointment. Over 80 percent of the patients had regularly followed their blood glucose levels but only 60 percent had the documentation at the appointment. The patient's responsibility of self-care should be enhanced using all means. (Hemminki, Lommi, Siefen & Winell 2011, 22-23).

The city of Oulu developed a multi-organizational care model where public, private and third sector co-operate to enhance the self-care of patients with chronic illnesses. The public sector coordinated and developed the care model so that it meets the patient's needs. Oulu has used a PHR, remote monitoring, secured communication, virtual group sessions and peer-support to enhance the patient's motivation and engagement with his/her self-care. As of 2014 the project is ongoing. (Angeria, Hirvasniemi, Pajunpää & Puolakka 2011, 23-24).

The Coper project in city of Turku focused on empowering the patient with cardiovascular disease with a citizen-centric PHR where meaningful information supported the patient to take care of his/her disease throughout everyday life. (Knaapila-Junnila, Korpela, Koskinen & Otim 2013, 4-5; Lahtiranta & Koskinen 2013, 87).

Collaboration between end-users and developers is meaningful. The health professionals, physicians and nurses are willing to take part in the development process of ICT systems when the focus in on usability improvements. (Hyppönen et al. 2013, 74).

2.2 Chronic Care Model

The care and cure model processes can be differentiated. The cure model means a process through which the client will be cured from an illness. The care model represents a chronic

care model process where the client and health professional have agreed on a health and care plan together. The chronic care process has regular consecutive action points and visits documented in the client's health and care plan. The pattern of the actions and visits are based on the local or regional health plan and path way. The care sessions or visits are often independent events. (Lillrank 2010, cited in Groop 2012, 11-12).

The health services context can be defined using a disease-oriented or supply-driven perspective. The disease-oriented approach emphasizes the need for care which is caused by neglected health problems. The supply-driven approach emphasizes the idea that all health related needs of a client can be cared for or cured. The expert-driven approach is related to the supply-driven health services. The freedom of making choices varies when the question is about the client's care or cure. The client and his/her needs are subjected to the assessment of professionals. The client assigned the freedom of choice to the professional and was satisfied with being heard when the professional made choices concerning his/her care. (Jäntti 2008, 61, 168).

The Chronic Care Model is widely used around the world. The Chronic Care Model consists of six elements; the community, the health system, self-management support, delivery system design, decision support and clinical information systems, all of which are described in Figure 2 below (Improving Chronic Illness Care n.d.).

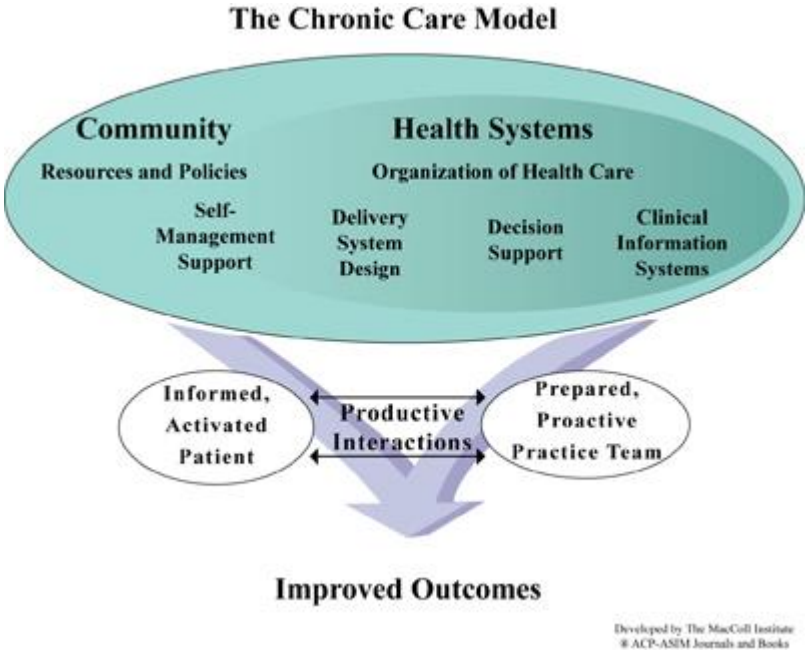

Figure 2. The Chronic Care Model by The MacColl Institute.
(Improving Chronic Illness Care, n.d.).

The productive interaction between the informed and motivated patient and proactive and prepared multi-professional practice team is achieved in the Chronic Care Model. The delivery system and case management support the patient's self-management. The patients are accomplished in self-management skills and have confidence in the self-care of their chronic disease. The self-management employs the 5A's: Assessment of knowledge, beliefs and behavior, Advice that is based on evidence, Agreement on patient's actions and goals, Assistance on problem-solving, Arrangement of a follow-up plan. The decision to support is based on evidence-based guidelines and proven education methods. The clinical information system facilitates the planning of patient care, shares information with the multi-professional team and patients as well as monitors the performance of patients self-management support. Different community resources and chronic disease federations support the patient's self-management. (Curry, Glasgow, Orleans, Solberg & Wagner 2001, 583-590; Improving Chronic Illness Care 2007).

The Chronic Care Model helps healthcare providers to improve patient health outcomes by changing the routines of care with these six elements. The aim of the Chronic Care Model is to change the daily care for persons with chronic illnesses from acute and reactive to a proactive, planned and population-based approach. The model is designed to achieve these goals through a combination of an effective team care and planned interactions like patient's self-management support, effective use of community resources and with the use of eHealth services. These elements aim to strengthen the relationship between the healthcare provider and the patient to improve health outcomes. (Austin, Brach, Coleman & Wagner 2009, 75.) Self-management support can be provided through various platforms like persons access to his/her health information, telehealth and telecare, community based skills-training and peer-support and interventions managed by health professionals. (Bower, Kennedy, Murray, Panagioti, Richardson, Rogers, Small & Stanton 2014).

Kaste Programme, the National Development Plan for Social Welfare and Health care, is a strategic steering tool to manage and reform social and health policy in Finland. One of the program's targets is to reorganize the social welfare and health care structures in a client-oriented way and help the national, regional and local actors to co-operate and implement the reforms. (Hyppönen et al. 2013, 19-20).

The first city in Finland to integrate the Chronic Care Model was Espoo. In 2009-2010 the Ministry of Social and Welfare (STM) established a working group to implement the Chronic Care Model in Finland. The POTKU project (POTKU is an abbreviation for patient becoming a driver) continued this work. Altogether 61 communities and nearly one million citizens were involved in the project. In 2010 the Institute of National Health integrated all different ongoing projects in Finland so that they would work together. This expanded the Chronic Care

Model in Finland. The major idea and goal was to develop a patient-centric care model with the element of self-care. (Oksman, Kuronen & Sisso 2013, 3-4). A second POTKU project is in progress until 2015. The POTKU 2 project supports the systematic implementation of the developed Chronic Care Model in the mid-region of Finland. (Potkuhanke n.d.).

The main goal is the active role of the patient in the decision process of his/her self-care plan. The new process applies to the whole multi-professional team. They all act to empower the patient and work together so they all build a strategy based upon the patient's perspective. The Chronic Care Model changed processes in the primary care units. It changed the attitude of the professionals as well as patient. The new model was well integrated to the care process. The POTKU project proved that the Chronic Care Model and the care plan built with the patient's input decreases nurse's appointments / encounters. (Oksman et al. 2013, 23-25).

The professionals involved in the POTKU project produced a questionnaire which aimed to clarify the personal goals of patients' care plan. The idea of this questionnaire is to prompt and motivate the patient to think and plan for his/her self-care and the goals he/she can reach. In the second POTKU project the professionals produced a tool to audit the care plans. (Oksman et al. 2013, 23-24, 29)

The RAMPE project developed the Chronic Care Model in Finnish health centers. The RAMPE is an abbreviation of skilled professionals who provide Chronic Care Model. The RAMPE project developed educational material and best practices to implement the Chronic Care Model to physicians and nurses who work in middle and eastern Finland. The chronic care model was developed with the QPR tool and the key customer care path was established in the project. The project published self-care educational material for the clients. The RAMPE project developed a timeline for the patient's chronic care. The timeline demonstrate the patients care and service process in conjunction with their daily life. The timeline combines different players, the public health and social care providers to the service providers who are contacted by the patient. The developed material is published in Innokylä (Innovillage in English), an open healthcare innovation community on the Internet. (Ahonen, Hämäläinen, Hänninen, Koikkalainen, Kettunen, Lämsä, Muranen, Ruorinen & Salminen 2013, 17-32).

The Kurkiaura project in Tampere implemented the Chronic Care Model to the integrated service system where public, private and third sector create a seamless service model to coronary artery disease care. The acute care is efficient but the rehabilitation does not meet the client's needs, support or motivate him/her to make changes for a healthier life nor recognize the importance and support the relatives can offer to the client. The Kurkiaura project's preliminary study introduces a service model where a care manager or service

integrator creates the suitable rehabilitation pathway and facility to the client based on the individual needs of the client. (Leimumäki & Päräkkä 2012, 5-14, 29).

The National Institute for Health and Welfare (THL) published a health and care plan and guidelines on how to use it. The health and care plan motivate the client to take responsibility for his/her care with the help of an information system. The health and care plan delineates a patient's health problems and his/her health plans, such as care and rehabilitation plans, and how these can be implemented. The uniform information content is a health promotion and self-care tool. The health and care plan steers the patient to become a motivated client of health services. (Komulainen, Mäkelä & Vuokko 2011, 12-13).

2.3 Self-care

The client has different roles in society. He/she is at the same time a citizen, consumer, client and patient. He/she is a member of society who makes individual choices. When he/she is a client of a health services he/she can choose an active role such as a consumer or he can be a passive object of care process. The Chronic Care Model aims to encourage the client to become a driver of his care. (Jäntti 2008, 47, 50).

A patient's role, as a client in healthcare, is based on the organization's processes and profiles. The clients define themselves differently. Their definition is based on how they are capable of managing the change of their everyday life after they are diagnosed with coronary artery disease. The Kurkiaura project created a model whereby the clients were catalogued by the severity of their illness and their capability of self-care and motivation to change their everyday life. (Leimumäki & Päräkkä 2012, 11, 15-19).

The standard of living and expectation for quality of life has changed in the past decades. People are searching for a higher quality of life and personalized services and goods. Individuals desire an easier and more comfortable life-style and they expect personally tailored goods and services. These expectations are reflected in the customer's expectations of health care services. (Mager 2004, 12-19).

The definitions like self-management, self-care and directed self-care were essential to differentiate. Self-management has been defined as individuals who take care of their own health and well-being. Self-management includes activities the individual takes to lead a healthy lifestyle, to care for their long-term conditions, to prevent further illnesses and to work efficiently with health professionals and other community resources. (Bower et al. 2014).

Self-care refers to activities and practices to maintain and enhance a person's short- and long-term health and well-being on a regular basis. It means looking after oneself in a healthy way, taking into consideration diet, exercise and medication, continuing to work and staying active by doing things that are important to her/him. Self-care is a learning process with personal goals and the self-regulation of a patient. (Mehammedsrage 2011, 2; NHS Choises 2012).

Directed self-care refers to a person's self-care based on his/her health and care plan and co-ordination with a health care provider. The directed self-care is based on the care process of a chronic illness, use of an eHealth solution and a Chronic Care Model. (Kariniemi, Lähteenmäki & Vainio 2014, 28, 31).

A person's ability and motivation to take care of his/her chronic illness varies. Knaapila-Junnila et al. (2013) presented the Coper pilot project in their paper. The Coper concept was based on the "Homelike being-in-the-world concept" by Svenaues and "Sense of Coherence" by Antonovsky. A person's illness alienated one's "homelike being-in-the-world", his awareness of his body and mind was changed. The feeling of "homelike or unhomelike being-in-the-world" was very personal. A person's "Sense of Coherence" could be disturbed during illness. People experienced their health, illness and coping with their illness in everyday life individually. They were the experts of living their lives with a chronic disease. (Knaapila-Junnila et al. 2013, 2-5).

Those with diabetes experienced a slightly lower quality of life if they had several chronic diseases. In the survey about their quality of life, male and female type 1 diabetes patients responded that their illness negatively impacted upon their everyday life, traveling and ability to plan for the future. (Nuutinen 2010, cited in Koski 2010, 53).

Health promotion and health literature support self-care. Health promotion is one topic in the Finnish health care act. The health and social ministry is funding the development of health promotion projects in Finnish municipalities. Suomen Diabetesliitto ry, Finnish Diabetes Society, develop, inform and educate diabetics, health professionals and municipalities about best practices of care and focusing on the self-care of diabetes. (Koski 2010, 24-25).

The motivation to self-care is based on self-determination. The client understands the health promotion and health literature given to him and can process his intrinsic motivation. The self-care is based on a person's own values. At its best the health and care plan meets the client's everyday life requirements and is a tool to process the client's goals and objectives in his self-care. (Knaapila-Junnila et al. 2013, 2-5).

In this study the definition of self-care was considered to include the phrases self-care (Mehammedsrage 2011, 2; NHS Choises 2012), self-management (Bower et al. 2014) and directed self-care (Kariniemi et al. 2014). Health care providers offer services for clients. Self-management and directed self-care are parts of the services provided to customers. For a client self-care has a holistic perspective. Self-care is a part of his/her everyday life.

2.4 Service Design and Management as the Framework

The healthcare sector has been in turbulence for several years. The healthcare costs are rising, the baby boom generation is retiring, diabetes and other chronic illnesses are increasing, so the number of health care personnel is decreasing when the baby boomers retire. At the same time individualism is rising which can be seen as the patients desire to be served as individual clients and to take part in decision making. The clients' experience of the health services does not meet their personal needs for care. The needs can be tangible but more often than not they are intangible, such as in scenarios where the client has to cancel business meetings or make changes to his/her schedule to be able to travel to the hospital for an appointment. The first wave of digitalizing healthcare was in the form of health information web portals. The business model mutations arise from the reconfiguration of assets caused by the unmet needs of individuals and as such, make the old boundaries of the healthcare sector obsolete. (Zuboff 2010, 4-12).

Service design aims to ensure that services are useful, usable and desirable from the client's point of view. It also ensures that the services are effective, efficient and distinctive from the supplier's point of view. It is a holistic approach to look at the systems and subsystems of relationships and interactions. (Mager 2009, 34, 37).

A service can be defined as an activity or an event that occurs due to a transaction between a client and a part of the service organization. The activity or event can be implemented between two or several persons, machines, software or a combination of these elements. (Evanson 2008, in: Miettinen 2011, 30). The service has several touch points. These touch points can be divided into channels, objects, processes and people. Channels can be multichannel customer experiences with physical and digital channels. Objects of the service are items the customer uses or gets while using the service and they have a communicative role in the service. Processes and procedures of the service and how the service is produced and experienced are important to analyze and understand. The processes can be subject to service gestures which have a great impact on the customer experience. People have the central role in the service delivery. It is important to understand the roles of the people; the consumers and providers of the service. (Koivisto 2009, 145-148).

The user-centric service design approach positions the user of the service in the center of the design process. The service is seen from the users' perspective. The service chain presents the organizational perspective of the service. The customer journey recognizes the process that the service provider suggests and the customer's personal choices that are based on his/her needs and behaviors. Each customer constructs his unique customer journey. The customer journey and the service moments can be mapped out as a concept design phase of a new or changed service. The mapping helps the service structure to become understandable and can be shaped and critically examined. It is important to discover the service elements which are missing or what other service providers or departments are offering. The customer journey identifies if other service providers or departments are in the right setting in the customer journey to create a complete customer experience. (Koivisto 2009, 142-145). The eHealth solutions usually have several users such as clients, nurses, physicians and a multi-professional care team. They experience the service from their point of view and the experience of the service can vary.

The companies as well as health providers create new and innovative services to enhance their competitive strength or to respond to changing customer needs or changes in society. The companies or organizations need to change the rigid structures and modes of operation if they wish to be customer-oriented. The change can cause growing pains and can encounter challenges in the decision making culture of the company or organization. Motivation to change the routines and practices is necessary. Participation of the staff in service development is essential as well as to educate the staff to notify the customers of changes. (Hämäinen & Lammi 2009, 191-193).

A service consists of a number of features which are related to the service process and the outcome of the process. A service offering concept should be based on customer perspective. A service package is a bundle of tangibles and intangibles which together form the service. The service is divided into core or main services and auxiliary or extra services. The auxiliary services can be divided into enabling or facilitating and enhancing or supporting services. The enabling services are necessary for the core service. The core service does not function without the enabling services. The supporting service does not enable the use of the core service but increases the value of the service or differentiate it from competitors. For example, the diabetes nurse's appointment is the core service. The enabling services for the core service are scheduling the appointment on the phone or on the internet or the registration of the appointment. The supporting services would be additional information of the location or a friendly waiting room. (Grönroos 2007, 184-186; Koivisto 2011, 44).

Figure 3. Service package.
(Grönroos 2007, 184-186; Koivisto 2011, 44).

In the eHealth service the core, enabling and supporting services are similar to the tangible services model, but the accessibility and interaction aspects are merged into one communication element in the process and the physical resources of the service consists of the user interface with the eHealth solution. The communication can be one or two-way communication. In the eHealth service the information is a critical element as it supports the core service as well as enabling and enhancing services. The client is an active participant in the service. The client acts partly as a co-producer of the eHealth service and this action enables the client's value-creating process. Depending how the eHealth service creates value to the client he/she is willing to use it and vice versa. (Grönroos 2007, 199-201).

The diabetes care in a hospital is a continuously rendered service. It involves continuous flow of interactions between the client and the multi-professional care team. The continuously rendered service creates a sound relationship with the client and the service provider. The physical service like the diabetes nurse's appointment is a high-touch service. These services are dependent on people in the service process producing the health service. The software used for the self-care of the diabetes is a high-tech service and it is based on the use of the information technology. The client's active participation is essential in the high-tech services. Clients are co-producers in the self-service and co-creators of value for themselves. The clients are required to fill an active co-producer role when using the software, information and resources provided for them. High-tech services are dependent on the service orientation, user interface and customer-consciousness of service provider's personnel, because human interaction seldom occurs. When the client using self-service needs human interaction by the high-touch services, they usually have a critical situation such as a system failure or questions about their health problems. (Grönroos 2007, 57, 190, 199).

The service elements required to produce a service are important to define. The service elements can be divided to interactive and supportive, hidden elements. The interactive elements are the visible part of the service for the client. The hidden elements do not have a

customer focus but have an impact on the service and how the client experiences it. These elements are administrative in nature such as invoicing, taking care of complaints or quality problems, technical support such as cleaning or maintenance services and software support. The hidden, supportive elements promote the service and can be understood as value-enhancing services by the client. The interactive elements can be divided into resources and processes such as customers, customer service staff, healthcare professionals and eHealth solutions, operational processes, facilities and software. (Grönroos 2007, 2-4, 221-223; Koivisto 2011, 46-48).

The client participates actively in the service process and production. Therefore the client is understood to be a resource of the service. The contact resources such as the customer service staff, healthcare professionals or eHealth solution's user interface are in direct interaction and contact with the customer. The interaction can be a planned visit, telephone encounter or secured online communication. The service provider's administrative and operational processes and routines have an effect on the client's service experience as well as the performance of the customer service staff duties. The staff is performing their duties using the operational processes such as clinical practices, treatment pathways and responsibility for care. The physical resources of the service are those such as location and facilities of the service provider as well as the guidance to the waiting room or how inviting it is. The user interface of the eHealth solution and the devices used for telehealth are physical resources too. (Grönroos 2007, 2-4, 221-223; Koivisto 2011, 46-48).

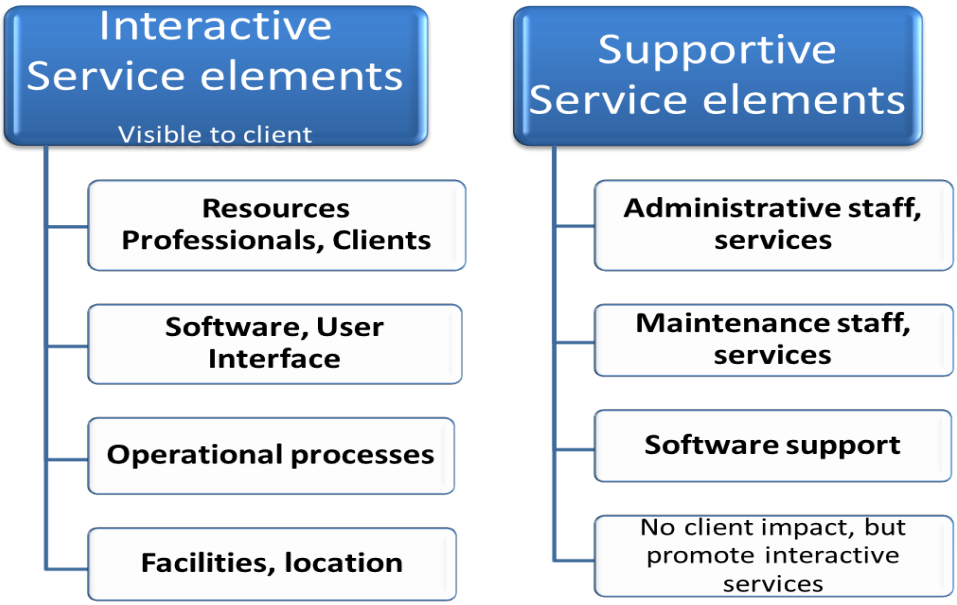

Figure 4. The service consists of the interactive and supporting service elements (Koivisto 2011, 46-48).

The service design is based on the co-creation. The users and the usability of the service are at the core of the design process. The service design focuses mostly on the interactive but also on the facilitating elements of the service. (Koivisto 2011, 49). In the service design process the service can be reduced to components such as single act, episode, service path and relationship level. The reason behind defining the components is to understand the service structure and to develop the customer satisfaction and quality of the service as well as create value and better outcomes to the service provider. The interaction between the client and service producer take place in a service path and it creates a long term relationship between customer and service provider. The service path is a useful tool for developing a single service transaction as well as for building a customer relationship. A service path can be divided into continuous episodes of service and single acts. The client experiences the service by the acts of an episode. One single act can be seen as a point of contact. The point of contact can be a channel, a thing, a procedure and a person. The service episode of the diabetes nurse's appointment can be separated into acts such as schedule-time-to-the-diabetes-nurse-appointment, meet-the-diabetes-nurse and self-care-using-eHealth-service. Through these service components the clients perceive the quality of the service and the value-creation for the customer. (Grönroos 2007, 92-94; Koivisto 2011, 49-53).

In the service design one important notion is that the clients do not purchase or use services; they seek the benefits which these services provide them with. They look for offerings consisting of information, personal attention, care or cure. The customer-perceived service offering creates value for the client. He/she looks for services that assist his/her own value-generating process. The value is created throughout the relationship through interaction between the client and the service provider. (Grönroos 2007, 4, 27).

The use of eHealth changes the roles, responsibilities and workflows of health providers and the clients. The changed workflow models are poorly understood beforehand. The change management involves health care providers and clients. The physicians, nurses and other health professionals should encourage clients to take responsibility for their chronic disease when using eHealth. (Ash et al. 2006, 125-126).

3 Satakunta Hospital District as the Context of the Study

In Finland the proportion of people reporting any long-standing chronic illnesses is 45 percent whereas in other European Union countries this figure is 31 percent according to Health in Europe: Information and Data Interface 2011 statistics. The data for the indicator on "Self-reported chronic morbidity" came from the Eurostat survey "European Statistics of Income and Living Condition (EU-SILC)". (Heidi data tool 2010).

In Finland there are about 300000 diabetes patients of which 40000 have type 1 diabetes according to the National Institute for Health and Welfare. The type 1 diabetes patients are young or middle aged people. Every year almost 2000 new type 1 diabetes patients are diagnosed in Finland. The number of type 1 diabetes patients has increased by 18 percent during the period of the last ten years. (Sund & Koski 2009, cited in Koski 2010, 4-6).

The cost of type 1 diabetes patient care was 833 million euros in 2007 in Finland and 32 percent of this sum consisted of costs accrued by the district hospitals and primary care services. Additional illnesses increased the cost of type 1 diabetes care by 6 times. (Jarvala et al. 2010, 55-56, cited in Koski 2010). District hospitals have the responsibility of type 1 diabetes patient care in Finland. The care team consists of diabetes physicians and nurses. The other team members are ophthalmologists, dietitians, physiotherapists, podiatrists and psychiatric nurses. (Koski 2010, 31-32).

The Satakunta Hospital District offers specialized medical care services for the 231000 citizens living in in the South-Western part of Finland. The district has three hospitals located in the settlements of Pori, Rauma and Harjavalta. In the Satakunta region the expected demographic trend is aging. The number of those over 65 years old will increase by the year 2020. This change has a significant impact on the Satakunta Hospital District service production. In the year 2012 Satakunta Hospital District produced services to somatic illnesses for nearly 80000 patients. In the Satakunta region the number of noncommunicable diseases is the same as the Finnish average, but the number of diabetes patients is ten percent higher. Diabetes care causes approximately 15 percent of the specialized medical care costs in Satakunta Hospital District. (Satakunnan sairaanhoitopiiri 2013, 7-9, 103).

In 2013 the operational costs of the Satakunta Hospital District were 269 million euros of which 174 million euros were personnel costs. In 2013 Satakunta Hospital District had 69827 outpatient ward visits and 314785 planned visits of which 62344 were telephone calls which substituted a visit. (Satakunnan sairaanhoitopiiri 2014, 1, 17). In 2009 the Satakunta Hospital District had nearly 300 physicians and over 1600 nurses (Satakunnan sairaanhoitopiiri n.d.). The conservative business unit is responsible for the care of type 1 diabetes. The internal medicine ward A5 specializes in diabetes treatment, case management and self-management support. The internal medicine outpatient ward's activities are divided into medical specialties such as endocrinology and diabetes. The diabetes outpatient ward offers guidance and self-management support. In the year 2013 Satakunta Hospital District had around 2500 visits to the diabetes outpatient ward (Rautavirta 2014. Personal communication). The staff of the internal medicine and outpatient wards is working in multi-professional teams. The Satakunta Hospital District respects their clients, the patients. The hospital activities are based on Finnish laws and regulations. (Satakunnan sairaanhoitopiiri n.d.).

In the year 2013 the Satakunta region had 13000 diabetics in total (Kela, 2013). The main concern in the Satakunta Hospital District is that the expected number of diabetes patients will increase while the number of nurses will decrease before the year 2020. In Finland, the average age of licensed nurses in 2010 was 42.7 years. According to KEVA statistics (2011) nurses will retire at the age of 57.4. In the years 2010 to 2020 nearly 50 percent of licensed nurses will retire. (Keva 2011; Sairaanhoitajaliitto n.d.).

In Finland and especially in the Satakunta region the proportion of diabetes patients is estimated to increase in the future. In the Satakunta Hospital District a diabetes nurse has around 600 to 800 appointments per year according to Marja Rautavirta (2013. Pers. com.). The duration of an appointment is around 60 to 120 minutes. This means the diabetes nurse has appointments for 1.3 to 5.2 hours of his/her working day. In the Satakunta region the increasing number of diabetes patients will cause a lack of health professionals who are to take care of the increasing number of patients with chronic illnesses. The situation will be worse when the issue of retirement is taken into account. (Rautavirta 2013. Pers.com.).

Updating the health and care plan has become a routine operation in Finnish health organizations. The plan was accurate and updated for 86 percent of diabetics and 74 percent of the clients had taken part in the manufacture of his/her plan. The documentation of self-care and the person's goals needed improvement according to the study. (Herttuainen, Ijäs, Kesti, Rintala, Saario, Satuli-Autere, Sihvonen, Stenqvist & Winell 2011, 22).

The Satakunta Hospital District has developed a new care model for type 1 diabetes care in the outpatient department. The care model was based on evidence and best practices acquired from other hospitals. The objectives of the reorganized care team were documented. In the early stage of the patient's newly diagnosed illness the patient is met frequently in the outpatient ward by the multi-professional team to meet the patient's needs. (Rautavirta 2011, 15-16).

In the early 2000's Satakunta Hospital District piloted eServices in the Makropilotti project. The Hospital District has been developing the health promotion and eLearning portal for diabetes patients alongside Satakunta University of Applied Sciences. The Satakunta Hospital District has systematically developed the type 1 diabetes care model based on multi-professional team work. (Rautavirta 2011, 15-16). The multi-professional team is plans and operates together with the patient to achieve the best care for him/her. The Satakunta Hospital District has documented the care model. The care model is based on the national recommendations and is adapted according to the local resources and clinical practices. (Satakunnan sairaanhoitopiiri n.d.).

4 Purpose of the Study

The purpose of the study was to develop a client-driven service model for diabetes care in the Satakunta Hospital District to meet the challenges of an increasing number of diabetes patients in the near future. The client-driven service model was co-created with the participants of two focus groups in order to change the participant from being a patient to becoming a client of the service.

The aim of the new service model was to support the client in implementing his/her care plan in his/her everyday life. The service was expected to add value to those clients who are willing to use the service and have fewer appointments at the hospital outpatient ward. The client was supposed to have an opportunity to apply his/her care plan to his/her everyday life and to plan when to schedule an appointment with the health professional. The client-driven service model was estimated to offer the possibility to the client to take more responsibility of his/her care process than self-care by the care and service plan formed with the multi-professional care team. The new service model was anticipated to enable the health care professionals to coach the client and to support an enlarging number of diabetes patients.

In this study the research tasks were:

1. A literature review of Chronic Care Model, eHealth, self-care and Service Design and Management used in health care was conducted.
2. The data collection with the CoCo Cosmos tool was planned and implemented plan and implement and the data analysis process was contemplated.
3. A new service model for type 1 diabetes care was developed.

5 Methodological Background

The purpose of the study was to develop a client-driven service model for diabetes care in the Satakunta Hospital District. The research tasks followed each other iteratively. Action research was regarded as an appropriate method for the study. The data was collected with an innovative service design method. The participants of the study, two focus groups, took part in the workshops voluntarily.

The data was collected with the CoCo Cosmos play, an innovative service design tool, in co-creation workshops. The data consisted of photographs of CoCo Cosmos plays, researcher's notes and video recordings. The collected data was analyzed using a qualitative approach.

5.1 Action Research

Action research was chosen as a method to describe the development process and the outcomes of this study. Action research is a suitable methodology to understand the underlying problems and to enable organizational changes as well as for developing and innovating working processes. (Moore, Crozier & Kite 2012). The developer is a part of the organization and is seen as an outside facilitator tasked with bringing the change to the organization. Action research can be described as an enquiry with people. It is a collaborative approach and it provides the organization with the means to take systematic action in order to develop the activity within the organization. The information produced in the process should be useful to the organization in question. (Eriksson & Kovalainen 2010, 194-196, 198). The action research has similarities with the innovation process. The change created, as the result of the research outcomes, can be even more important than the knowledge gained. (Järvinen & Järvinen 2011, 129-130).

Action research is a continual process with cycles. It has activities or cycles such as planning, action, evaluating the action and leading to further planning and so on. It begins with understanding the context of the problem and follows with understanding of the necessity of the project and the problems diagnosed. The enactment of the cycles of planning, taking action and evaluation can be anticipated but cannot be designed in detail in advance (Coughlan & Coghlan 2002, 222-223).

According to Engström (1998) the first working hypothesis is the description of the present situation in the operating system. The second hypothesis is structuring the alternative development paths. The third working hypothesis is the description of the new model. The hypothesis is not exact but it enables several detailed implementation varieties. The new model can be divided into sub hypotheses to identify and specify the sub solutions of the new model. (Engström 1998, 121).

This action research study had three phases as described in Figure 5.

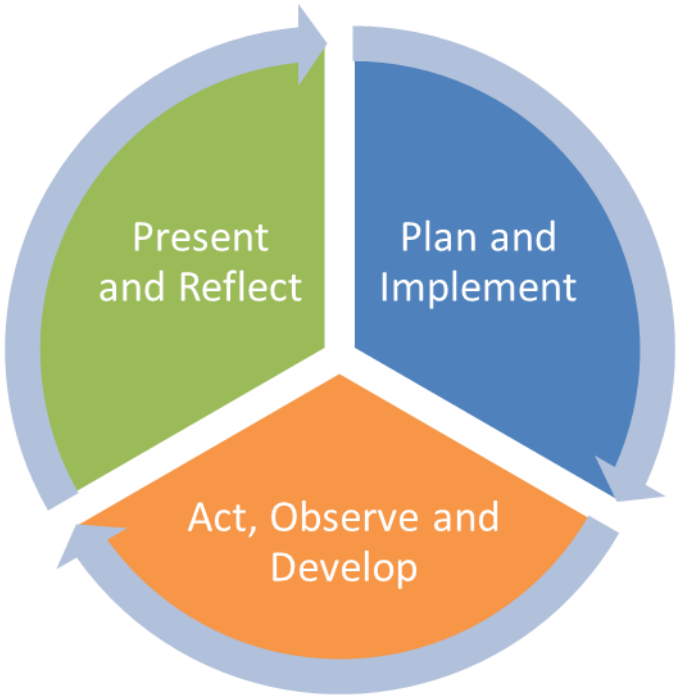

Figure 5. The action research phases in this study.

5.2 Innovative Service Design

An innovative method was chosen to design the new service model and as a data collection method in this study. The iterative process of co-creation was well suited to action research. The service innovation process supported the study task to develop a new service model for type 1 diabetes care.

Innovative methods have a visual and participatory nature in the form of design workshops, collage, card sorting, cognitive mapping, visual diaries, camera studies and document annotations. The customers participate in the service design process. (Miettinen 2009, 64-70). Service innovation is a process that requires a disciplined approach to identify and implement the most promising ideas. Service strategy influences organizational attitudes and culture. The service provider's administrative, operational processes and routines affect the client's service experience as well as the performance of the customer service staff's duties. The value proposed by the service should fit the needs and expectations of customers and service organizations. The culture and leadership of the organization ensures that the processes, roles, responsibilities and skills are accurate enough to operate the service effectively. The organization needs evidence and tools to monitor the new or improved service. Prototypes assist evaluation and present the customer's needs. The prototype of the service model saves time and resources. It reveals how the different elements of the service would work. The

piloting of the service focuses on testing the new service. The service innovation and prototype ensure that the service is delivered to targeted customers. (Ojasalo & Ojasalo 2009, 101-105; Vaahtojärvi 2011, 134-137).

Co-creation is an innovative method and an interactive process in service design. The co-creation approach emphasizes design methods when planning a complex, multi-channel service processes. The co-creation perceives a client's point of view and observes the multi-professional network and their cooperation. The service user's knowledge is put in to the practice. (Mattelmäki & Vaajakallio 2011, 77-83; Vaahtojärvi 2011, 140).

The CoCo Tool Kit was developed during a research project with Laurea University of Applied Sciences together in partnership with VTT Technical Research Centre Finland and the University of Cambridge. The CoCo Tool kit includes five different tools: CoCo Interview, CoCo Self-assessment, CoCo Continuum, CoCo Tree and CoCo Cosmos (Laurea 2013, Laurea 2014).

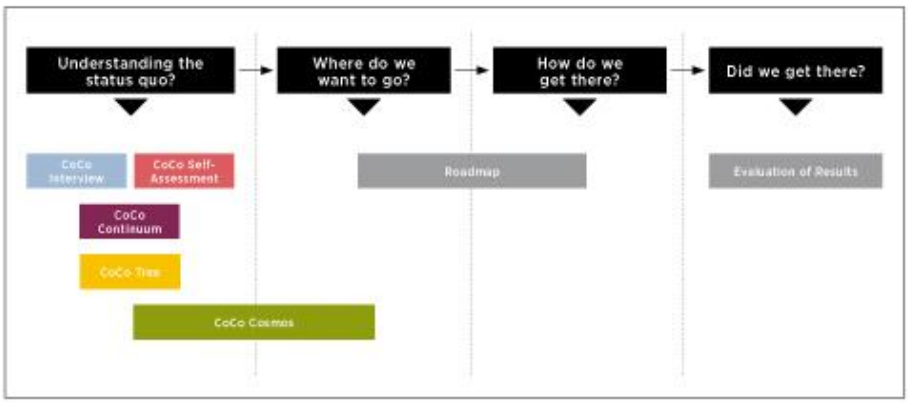

Figure 6. The CoCo Cosmos tool helps the organization to understand the status quo and the new situation it aims to achieve.
(Laurea 2014).

The CoCo Cosmos is a communication tool which is designed for company-customer activities in the business of service providing. The CoCo Cosmos is a collaborative card-based tool and a visual collaborative service design research tool. It covers the co-creation phenomenon from the three viewpoints: value co-creation, coproduction and collaborative new service development point of view. (Dusch, Keränen, Moultrie & Ojasalo 2013a, 153; Laurea 2013).

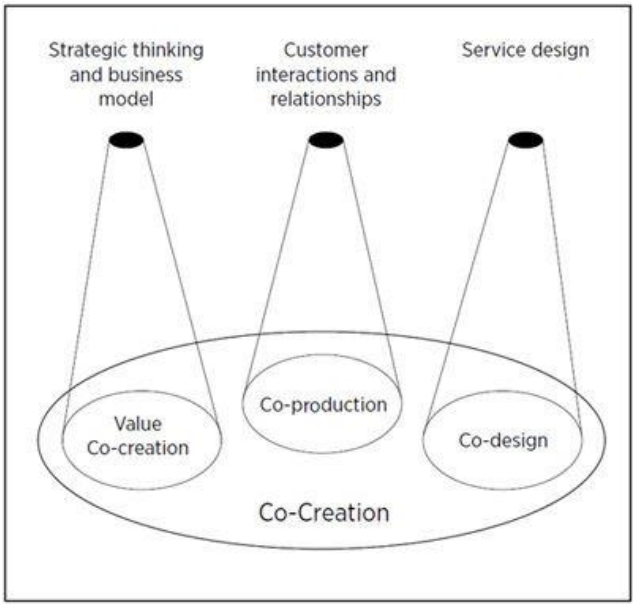

Figure 7. Co-Creation with the CoCo tool kit.
(Laurea 2013).

In the co-creation approach using the CoCo Cosmos play the business goal is to create a comprehensive client solution that give stakeholders value-in use. The approach is targeted at the client's value creation process instead of the health organization processes. It emphases shared recourses among the clients, staff and other stakeholders while the conventional approach focuses on the organizations own competence, resources, processes and technologies. The co-creation approach addressed the entire value network whereas the organization focused on company's own in value chain. (Dusch et al. 2013b, 14).

In this study the CoCo Cosmos tool was chosen, because it aided in understanding the current state and visualized the new service model and its stakeholders. The CoCo Cosmos used cards as a visual method to describe a service setting. The CoCo Cosmos tool identified the interdependencies among the stakeholders. The players built a service setting with the help of the tool kit and it revealed enablers and barriers in the service. (Dusch et al. 2013b, 53).

The data of this study was collected with the CoCo Cosmos plays. The user-centered creation process motivated the multi-professional team as well as experts with experience of developing a customer-oriented service. The creation process was based on their expertise. In the designing process the service was viewed as a dynamic process with numerous players, products/services and facilities/places. It took into account the temporal aspects of the modelled service. The service experience encompassed physical elements tided in certain locations and time. It identified net-offered communication and self-service elements in the same process. Intuition and discussion were important in the co-creation process. The co-

creation was a suitable method for designing and developing a new service model where appointments were combined with eHealth interaction. (Mattelmäki & Vaajakallio 2011, 77-83; Vaahtojärvi 2011, 140).

5.3 Participants of the Study

Satakunta Hospital District's diabetes nurse agreed to find voluntary participants for the two focus groups of the study. The members of the multi-professional type 1 diabetes care team of Satakunta Hospital District and diabetics from the Satakunta region were asked to participate voluntarily in the development process of the study. The participants of the client's focus group were patients who acted as experts with experience of diabetes.

A letter of consent was given to participants. In the letter the purpose and means of the workshops were described. The letter of consent is enclosed in Appendix 2. The participants were informed of the photography, video recordings and research note taking. The participants were asked to sign the letter of consent before they participated the workshops. All participants signed the letter.

The members of the multi-professional care team participating in this study were diabetes nurse from the outpatient ward, diabetes nurse from ward A5, podiatrist and dietitian. All professionals were experienced in their field and specialized in diabetes care. The professionals' group attending the workshops did not have a diabetes physician as a group member.

All the participants in the experts with experience group have had diabetes for several years. They were experts of their self-care and their illnesses were in a stable state. The participants were women aged between 44 and 51 years. Two of the participants had an insulin pump as medication. One of them had multiple dose injection (MDI) therapy. They all were very familiar with their medication and their treatment. Two of the participants knew each other in advance through other contexts whereas the third participant was unknown to the rest of the group.

The participants of both groups brought their own expertise to the co-creation workshops and development process with CoCo Cosmos play. They observed the same phenomenon from their point of view. The client's viewpoint was expected to be client-driven and related to the self-care in their everyday life. The professionals' viewpoint was anticipated to be expert-driven and related to the supply-driven health services and care process of type 1 diabetes.

5.4 Data Collection

The first step in the action research of this study was to gain an understanding of the field, to design the project as research in action through iterative activities and identify the research questions. The action research process began with several discussions with the Satakunta Hospital District and colleagues. The problems of the current state were clarified in the discussions with administrative director of nursing Paula Asikainen and diabetes nurse Marja Rautavirta. The discussions clarified the problems within the near future where the number of diabetes clients is expected to increase whereas the overall available resources and the number of diabetes nurses will remain constant. The need to make changes or find new ways to treat the increasing number of diabetics was evident. In these discussions the research question was recognized and a working hypothesis was acknowledged. The idea of development and an action research study was presented to the organization. Research permission was applied for and granted. The permission was necessary as the researcher was not member of the working community. (Asikainen 2012. Personal communication.; Eriksson & Kovalainen 2010, 198; Rautavirta 2013. pers.com.).

According to Engström (1998) the first cycle in action research produces a working hypothesis. The working hypothesis is a description of the historical development cycle and any discrepancies in it. The identification of the historical development cycles provides the basis for the interpretation of different practices, means and ways of thinking. The discrepancy is formed when one part of the work or the valuation of different parts of the work changes. (Engström 1998 137-139).

The first phase of the action research was the planning and implementation of the action research. It had four periods that followed each other iteratively.

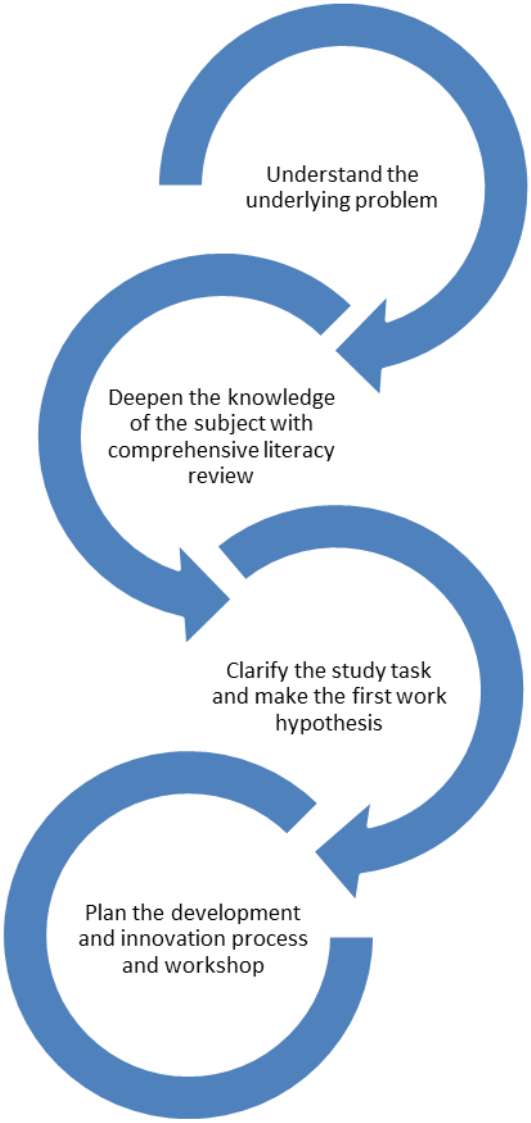

Figure 8. The periods in the plan and the implementation phase of the action research.

These iterative periods of the plan and implementation phase related the earlier studies to the research tasks, cultivated and elucidated the working hypothesis of the study.

The working hypothesis of the study was to innovate and develop a client-driven eHealth service for type 1 diabetics where eHealth is integrated into the care and treatment plan and face-to-face health procedures. In the new service model the clients would have the opportunity to choose when to use eHealth and when to meet the health professional in person at the outpatient ward. The working hypothesis resembled the digitized service model of the banking sector in Finland. In the planning phase the working hypothesis described the potential of the possible innovation. The model outlines the target state at the outset of the

construction process. The model includes confidence in the innovation's usefulness and a normative statement of how the innovation ought to be. (Järvinen & Järvinen 2011, 114).

Planning the data collection method and how to implement the data collection into the action research processes was discussed with the members of the organization. The innovative service design was chosen as a data collection method. In the co-creation workshops the participants were active players and added value to the service innovation process. This process supported the user-centric service design approach where the users and the usability of the service were in the core of the design process. The data collection in co-creation workshops was seen as a mini-intervention. The service design process may have generated feelings or expectations which may have added significant data to the project. (Coughlan & Coghlan 2002; Koivisto 2009, 49, 142-145).

The innovative service design and the CoCo Cosmos, a collaborative card-based tool, were chosen to collect data and design the new service model as required. The innovative method as a data collection method had a visual and participatory nature and it was creative (Miettinen 2009, 64-70). Service innovation with the CoCo Cosmos tool was a process which required a disciplined approach to identify and implement the most promising ideas (Ojasalo & Ojasalo 2009, 101-105). The data was collected in three workshops. The participants discussed, co-created and played with the CoCo Cosmos collaborative card-based tool in the workshops. The researcher was a facilitator, made notes, took photographs and video recordings during the workshops. The collected data was expected to identify and reveal the relevant information collected during the workshop (Mattelmäki & Vaajakallio 2011, 81-82).

The action, observation and development phases of the action research started with a training session on how to facilitate a workshop where the CoCo Cosmos collaborative card-based tool is in use. This training session occurred on the 22nd of April 2014 at the Service Innovation and Design Unit at Laurea University of Applied Sciences.

On the 26th of April 2014 the researcher did a zero level play with the CoCo Cosmos to design a new service model for diabetes. During this session the researcher planned how to facilitate the workshops.

The co-creation workshop's steps were planned as Mattelmäki and Vaajakallio (2011) had described for a typical co-creation session in their paper (Mattelmäki & Vaajakallio 2011, 81). The workshops were carried out similarly with both focus groups. The workshops included four stages. The different stages, actors and tasks of the workshops are presented in the Table 2.

Presentation	•The participants and the researcher, in a role as a facilitator of the workshop, presented themselves to the other members of the focus group. •The researcher presented the purpose of the workshop and the idea of the development process
Warm-up for the teamwork	•The facilitator gave a short description of the terms used in the workshop like co-creation and eHealth. •She presented the CoCo Cosmos collaborative card-based tool, the cards, pen, cleaning cloth and the use of the tool. •The facilitator described the workshop's tasks to the focus group. She explained her role as a facilitator in the workshop and the reason of photographing and video recording.
Co-creation process with the CoCo Cosmos tool	•The paricipants worked together to visualize the present care process in the Satakunta District Hospital with the CoCo Cosmos tool. •The second part of the workshop was to visualize and co-create the new service with the CoCo Cosmos play. •The facilitator answered questions how to use the tool kit but did not interfere the co-creation process. The facilitator made notes and took pictures.
The focus group presented and discussed of their creation	•The participants discussed of the new model in the beginning of the collaborative play and during it. •They presented the CoCo Cosmos play to the facilitator. •The facilitator made notes and took pictures and asked questions of the unclear writing after the participants had presented the play.

Table 2. The different stages of the workshop.

In the co-creation workshops the CoCo Cosmos play was introduced to the participants and some examples were given. The given task by the researcher and the CoCo Cosmos play were understood to be semi-structured data collection. The researcher was a facilitator in the workshops. She answered questions about the cards and how to use them. She did not guide the participants or touch the cards once the participants had laid them on the board. The participants discussed about the task and made a joint decision where to place the cards and how to draw the lines on the board. It was an iterative process where they contributed, influenced and specified the service model together. When the participants felt they were ready the facilitator took photos of the CoCo Cosmos play. The workshops were video recorded as background information to understand the relationship between the cards, arrows and lines between the cards and written explanations shown in the photos. (Brinkman & Kvale 2009, 70-72; Dusch et al. 2013b, 53; Erikson & Kovalainen 2008, 65, 82; Guba & Lincoln 2005, 209).

In the first CoCo Cosmos play the participants were asked to visualize the current state. The facilitator placed 'customer' card on the blank board and asked the participants to place and name the actor on the cards and draw the interaction and relationship lines between the

cards. In the second play the facilitator placed the 'customer' and the 'eHealth' cards on the board. During the workshops the participants discussed in a lively manner and placed the cards while playing.

The workshops with the two focus groups were held on the 28th and the 29th of April 2014 in a meeting room in the Satakunta District Hospital.

1. The first workshop was held with the members of the multi-professional team on the 28th of April. The professional's workshop was held first because the clinical practices, treatment pathway and responsibility for care were considered important aspects in the service design although the care aspect was excluded from this study. The first workshop with members of the multi-professional team lasted only one and a half (1.5) hours. Therefore an introduction was sent by e-mail in advance to the participants. In the first workshop the participants had two CoCo Cosmos plays, the existing and the new service models. Later in this study the plays were coded as WS 1/1, WS 1/2.

Figure 9. The participants of the multi-professional care team playing and modelling the current care process and service with the CoCo Cosmos play.

2. The second workshop was held with the clients, the experts with experience of diabetes on the 29th of April 2014. The client's workshop lasted for three hours, as the introduction, play and discussion took time. No presentation material was sent to the participants beforehand. In the workshop the participants had two CoCo Cosmos

plays, the existing and the new service models. Later in this study the plays were coded as WS 2/1, WS 2/2.

Figure 10. The experts with experience of diabetes discuss whilst co-creating the new service model with the CoCo Cosmos.

After the second workshop the researcher analyzed the collected data; the photographs, notes and video recordings. The preliminary findings of the two workshops and four CoCo Cosmos plays were compiled as a presentation. The researcher planned the third workshop. The preliminary findings are enclosed as Appendix 3.

3. All participants of the two focus groups were invited to the third workshop which was held on the 13th of June 2014. The third workshop was held together with the two focus groups to accommodate the participants' summer holidays. All members except for one diabetes nurse were able to participate. In the third workshop the researcher presented the preliminary findings of the two workshops and four CoCo Cosmos plays in a power point presentation. The presentation was an interactive situation where the participants discussed the new model.

   After the presentation the researcher asked the participants to co-create and visualize, using the CoCo Cosmos play, a service path with suggested service episodes from the point of diagnosis up to a 12 month period of service for a newly diagnosed diabetes patient. Later in this study the play was coded as WS 3.

Figure 11. A snap shot from the video recording of the third workshop with participants from both focus groups and the facilitator making notes.

The co-creation workshops resembled a group interview like brainstorming, were the purpose was to collect participant's opinion of the current state or the new service model. The participants designed, redefined and specified the service model in the workshops. They used the CoCo Cosmos tool to understand the current state and visualize the new service model. This process seemed to occur as a series of thinking experiments or anticipatory simulation. The thinking experiments were examples of real life, models and suggestions of alternative ways of organize the action. The participants discussed, analyzed and combined these examples, models and suggestions in the workshops. The participants were building a service setting with the help of the CoCo Cosmos tool kit. Developing a new service model required several means of describing the process and to redefine, concretize and test it. (Dusch et al. 2013b, 53; Engström 1998, 146-147; Fontana & Fray 2005, 703-705; Miettinen 2009, 64-70).

5.5 Data Analysis Process

In this study the data was collected by innovative method. In the CoCo Cosmos play the participants visualized the actors, organizations and interactions of the new service and the organizational change in the existing and new service models using the cards, arrows and writing. The photographs taken of the five CoCo Cosmos plays in three separate workshops were the primary data of this study. The secondary data was research notes and video

recordings. They supported the primary data. The photographs represented a visual outcome of the co-creation workshops.

The collected data was analyzed by qualitative approach. The data analyzing phase was iterative and a continuum to the plan and action phases of the action research process. The data analysis approach was to describe and understand in a meandering spiral process as seen in Figure 11 (Hirsjärvi, Remes & Sajavaara 2001, 207-212; Järvinen & Järvinen 2011, 118-128; Johansson, Kristiansson & Matthis 2008, 480-481).

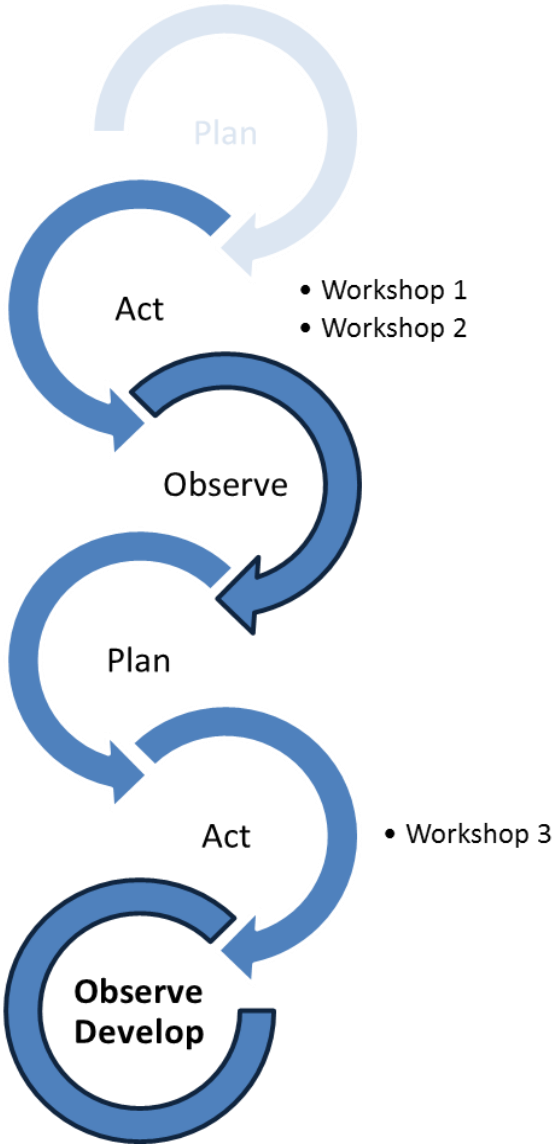

Figure 12. The data collection and analyze was an iterative processes like a meandering spiral of cycles.

After the first action phase, the two workshops, the data was analyzed preliminarily. The analysis of the collected data, the four photographs of CoCo Cosmos plays, revealed that the data illustrated a big picture of the existing and new services. The preliminary findings are enclosed as Appendix 3. The preliminary outcome was reflected in the thematic literature review. The outcome was considered too general to develop a concept for a new service model. The researcher decided to collect supplementary data so a third workshop was planned and carried out.

The photographs were analyzed to compare the clients' and experts' visualization of the CoCo Cosmos play of the existing and the new models. The differences and similarities were analyzed. Then the photographs were analyzed individually in parts to understand the business model, organizations, interactions and relationships between the actors of the CoCo Cosmos play.

The researcher was faithful to the co-created model delineated in the photos and she respected in principle the diversity of cultural forms. The model in the photos was analyzed through visual representation and structured properties of their visual elements. The photos were not analyzed purely visually but were explored as an integral part of the service model, organizational context, routines of work and by the thematic literature. The researcher's observations of the photos and their interpretation of everyday life were recorded in an excel sheet. (Atkinson & Delamont 2005, 824-826, 827). The data was analyzed by qualitative approach by data source triangulation. The primary data was the photographs. The notes, video recordings and the discussions during the workshops were used to support the analysis process. (Erikson & Kovalainen 2008, 293).

The data was collected in two workshops and four CoCo Cosmos plays. The workshops and plays were coded as workshop number/CoCo Cosmos play: WS 1/1, 1/2 and WS 2/1, 2/2. The collected data was transcribed, categorized and analyzed in two dimensions: the different components of CoCo Cosmos play and a thematic literature review as shown in Table 3.

Data Analysis Table			
	The different lenses of CoCo Cosmos play		
The collected data	Strategic thinking	Interaction, relationship	Service desing
1) Current state			
a) Professionals, WS 1/1	x	x	x
b) Experience experts, WS 2/1	x	x	x
2) New Model			
a) Professionals, WS 1/2	x	x	x
b) Experience experts, WS 2/2	x	x	x
	Service offering, added-value	Chronic Care Model, self-care, eHealth	Service desing, management
	Thematic literacy review		

Table 3. The data analysis table.

The thematic literature review consisted of the service offering, core and auxiliary services, the Chronic Care Model's six elements; the community, the health system, self-management support, delivery system design, decision support and clinical information systems as well as eHealth, self-care and service design and management.

The data from four CoCo Cosmos plays in two workshops was transcribed and categorized using IT facilities. The photographs taken in the two workshops of the CoCo Cosmos plays were analyzed visually and as qualitative data transcription:

- The data was categorized by clients' and experts' views to understand the similarities and differences of their CoCo Cosmos plays.
- The data was analyzed to understand the differences between the existing and the new service models.
- The photographs were analyzed individually in parts to understand the CoCo Cosmos play cards locations in relation to each other, arrows between the cards and participants' writing on the play board.

The content of collected data was categorized and sorted in a Microsoft Excel worksheet to understand their deeper relation to the different components of CoCo Cosmos play and the thematic literate review as shown in Table 4.

The transcribed data steered the categorization. The categorization and deductive analyze was carried out by the researcher. The data was categorized into four dimensions:

1. Thematic categorization by transcribed data
2. Categorization by chronic care model elements
3. Categorization by service elements
4. Categorization by adding value to client and/or professional

Analyze of the New Servcie Model				
Client's and Professional's view together				
Client's view is marked with red font and Professional's view with blue font.				
Transcribed from the photo, researcher's notes and video	**Transcribed grouped by content**	**Categorized by CCM**	**Service and strategy**	**Add value to**
Care team is in the lead until the customer is ready to take responsibility of self-car	Care team guide the customer	Delivery system	Core servcie	add value to clie
Client is responsible for customer relationship later	Customer as a member of the care team	Self-care	core servcie	add value to clie
The work is based on the content provided by the client	Customer as a member of the care team	Self-care and self-service	core servcie	add value to clie
One have to know the client	Customer relationship management	Self-Management	Core servcie	add value to clie
Double-sided confidence	Customer relationship management	Self-Management	Core servcie	Add value to prof & clie
Customers own care team is familiar	Customer relationship management	Self-Management	core servcie	add value to clie
Care team as a part of client's everyday life	Customer relationship management	Self-Management	core servcie	add value to clie
Client is a member of the care team	Client's role as a member of the care team	Self-service, self-management	core servcie	add value to clie
More time on the planned vist when no need to measure	Service model changes to the care community	Case management	Core service	Add value to prof & clie
Subjects change on planned visit when routines are handeled on-line	Service model changes to the care community	case management	Core service	Add value to prof & clie
The character of the planned visit changes when current busines is handled online	Service model changes to the care community	Case management	core service	Add value to prof & clie
Availability of the care team	connection detached from time and place	Case management	core service	Add value to clie
Planned visits reduces	client chooses the service channel, customer need	Case management	core service	Added value to prof & clie
The problem solving on the appointment	client chooses the service channel, customer need	Case management	core service	Added value to prof & clie
Renewing the prescription/remission on the appointment	client chooses the service channel, customer need	Case management	core service	Added value to clie
Planned visit is on realtime	client chooses the service channel, customer need	Case management	core service	Added value to clie
The basic safety is created on a planned visit	Professionalism is expected from the professionals	Case management	core service	add value to clie
The customer contacts the servcie and chooses the channel	client chooses the service channel, customer need	Self-care	core service	add value to clie
The customer is one user of the servcie Asiakas yhtenä käyttäjänä	client chooses the service channel, customer need	Self-care	core service	Add value to prof & clie
The eHealth forces to record	Own expertise is developed	Self-care	core service	add value to clie
Communicate on the insuline meters and pump	Own expertise is developed	Self-care	core service	add value to clie
In the servcie what is good for me	Own expertise is developed	Self-care	core service	add value to clie
the client brings the records of blood sugar measurements	Customer produces information	Self-care	core service	Add value to prof & clie
The client offer the summary of one's sensations	Customer produces information	Self-care	core service	Add value to prof & clie
the client offers photos of problem areas	Customer produces information	Self-care	core service	Add value to prof & clie
the customer offers knowledge	Client as a equal user	Self-care	core service	Add value to prof & clie
Responsibility of self-care is pronounced	Client as a equal user	Self-care	core service	Add value to prof & clie
"A Self-care Support Service"	Client as a equal user	Self-care, Self-management	core service	add value to clie
Care plan is online	Care plan becomes a part of everyday life	Self-management	core service	add value to clie
The mid-term review online	Care plan becomes a part of everyday life	Self-management	core service	Add value to prof & clie
What can we do that you'll take the responsibility	Care team is a safety net	Self-management	core service	add value to clie
The care team is the safety net	Care team is a safety net	Self-Management	Core service	add value to clie
"livespan" to customer relationship	Customer relationship management	Self-Management	core service	add value to clie
connection to the diabetes phycisian	client chooses the service channel, customer need	Self-management	core service	Added value to clie
connection to diabetes nurse	client chooses the service channel, customer need	Self-management	core service	Added value to clie

Table 4. A sample of the data transcription categorized and sorted in Microsoft Excel.

The data transcription was performed in Finnish and inputted into Microsoft Excel. The Microsoft Excel worksheet had seven (7) separate sheets. Five (5) of them were the five CoCo Cosmos plays. Two (2) of them were compounds of the two workshops of the existing and new service models. The sheets were labelled by workshop number as WS 1_current, WS 2_current, WS 1_new model, WS 2_new model, WS 3. Each row of transcribed data was categorized in three thematic categories: transcribed data, Chronic Care Model elements and service elements (core and auxiliary services). The new service model was categorized also as to how it adds value and to whom.

In the second phase the data was combined and sorted. Each Excel sheet was sorted firstly by chronic care model and secondly by service elements. The sorted data of WS 1_current, WS 2_current was copied to an Excel sheet and named WS1+2 current (prof+exp). The text font was color coded as red for client and blue for professional. The combined data WS1+2_present (prof+exp) was sorted firstly by transcribed category, secondly by Chronic Care Model elements and thirdly by service and strategy category. The same procedure was completed with the data of WS1+2_new model (prof+exp). The categorization by added value was analyzed only for supporting purposes in WS1+2_new model (prof+exp). The data transcription with categories is written in Finnish.

In the third workshop the participants from both focus groups together visualized a customer journey and a blueprint for the new service model in the fifth CoCo Cosmos play. The photos of the customer journey were the primary data to be analyzed from workshop three (3). The data was classed by views of experts with experience and the multi-professional team in separate columns in an Excel sheet. These columns were transcribed together to create themes in a third column as can be seen in Table 5. The data was analyzed by the themes for a service blueprint. The transcribed data was secondary data which supported the primary data.

Blueprint of the concept of new service model with eHealth comibined to physical doctor's and nurses appointments		
Experts of the Experience	Multi-professional team	Grouping to themes
The customer is sent to the hospital by private/public doctor	Laboratory tests and physical examination	Intensive care on the ward. The customer is in a patient's role.
She/he is taken in to the ward or on the outpatient ward	Diabetes doctor's appointment	The doctor, nurse and the health care organization is leading the service path
Nervous, afraid, unknowing of his/her situation	The professionals document the medical care in the EMR	
Family members support but can increase anxiety		
The person is on a sick leave, can't work		
Diagnose	Diagnose	Care on the ward, learning self care

Table 5. A sample of the data transcription and categorization of themes of the workshop WS 3 in Microsoft Excel.

The data analysis was an interesting process. The planning process of the analysis method of the photographs was challenging. The planning process of the transcription especially to

combine the data transcription with Chronic Care Model elements and Service Model elements and strategy was challenging but at the same time very intriguing. After planning the Excel sheet and transcribing the photos of the CoCo Cosmos plays, the data showed a preliminary congruence with the research themes. The categorizing and sorting process with Microsoft Excel contributed to the analysis. The findings are presented in the following chapter.

6 Findings

The data was collected in three workshops. The five CoCo cosmos plays were an innovative method where together the participants contributed influenced and specified the service model in the workshops. The collected data visualized the existing and the new service models from participant's point of view.

The analyzed data underpinned the expected starting point of the relationship between the professionals and experts with experience. The experts with experience were clients of the service whereas the professionals were representatives of the organization and service providers. The customer and service provider had a mutual understanding of the service provided. The self-management program of the Chronic Care Model depended on collaboration between patient and care provider. (Curry et al. 2001, 589; Grönroos 2007, 25, 36). In the following chapters the actors of the multi-professional care team and other professionals are comprehended as service providers and the experts with experience as clients.

The analyzed data corresponds with the service design and management literature and other reviewed literature in this study. The concept of the new service model for type 1 diabetes care is based on the analyzed data and theoretical framework of this study. The findings are presented in the following three chapters that enlighten the current state, the new service model and the blueprint of the service model of diabetes type 1 care.

6.1 The Current State

The participants from both groups, the professionals and the experts with experience, were asked to visualize the current state with the CoCo Cosmos play.

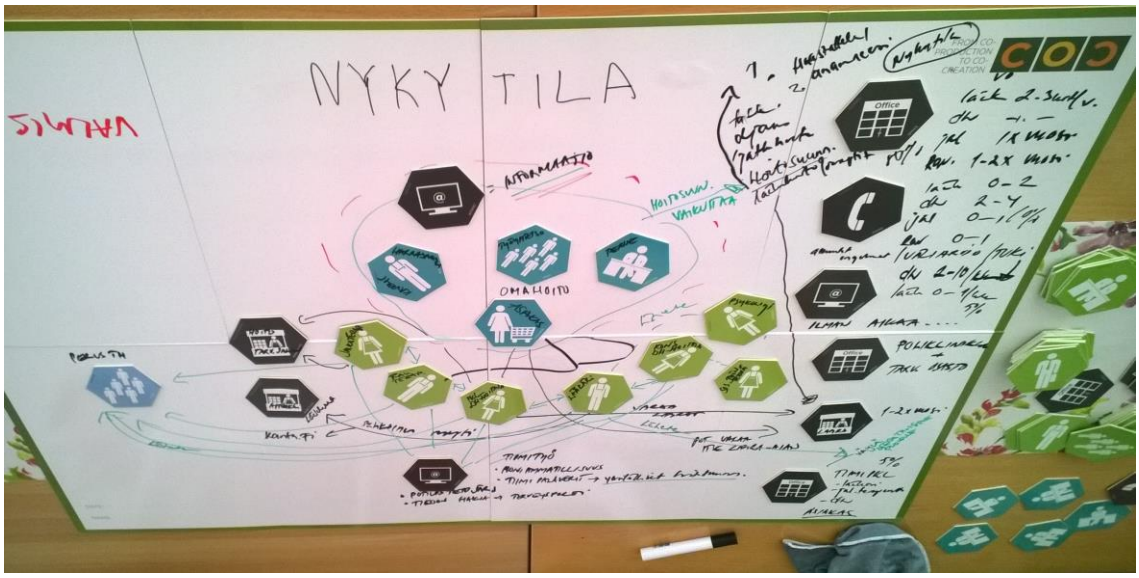

Figure 13. The multi-professional care team's CoCo Cosmos play of the current state of type 1 diabetes care.

Figure 14. The experts with experience's CoCo Cosmos play of the current state of type 1 diabetes care.

The photographs of the CoCo Cosmos plays in a bigger scale are presented in Appendix 5.

The two pictures of the CoCo Cosmos play demonstrate the views of clients and service providers of the current state of diabetes care. The professionals visualized the play based

upon how the organization provides services to the client. The experts of experience pictured based upon how they are using these services.

The following themes emerged from the analyzed data of the current state:

- Delivery system
- Communication and interaction
- Self-management support and client's everyday life
- The Service Model of the current state

These themes are described in more detail in the following chapters. Each chapter has detailed findings from both workshops. These themes describe findings from the service providers' and the client's perspectives.

6.1.1 Delivery System

The analyzed data reveal the delivery system and especially the connections between **the multi-professional care team**. In the picture of the professionals' CoCo Cosmos play the delivery system, multi-professional care team, their responsibilities and communication between the physician and team members were visualized with arrows. The professionals view is focused on their organization and processes.

Figure 15. A closer look in to the professionals' view of communication and responsibilities between the multi-professional care team members.

The physician and diabetes nurse are the core professionals available to the client. The physician is responsible of the patient's care plan, medication, prescriptions and referrals for laboratory or consultations with other professionals than the care team. The diabetes nurse supports the client in his/her self-care and coordinates it with the multi-professional care team. The nurse manages the connections to the health care center's distribution of medical

supplies. The communication between the members of the care team and the connections with other regional service providers are described with arrows.
The patient is in a central role. The roles and tasks are defined in the multi-professional care team. The delivery system acts to contribute to good quality care for clients.

The experts with experience visualize the multi-professional care team and their responsibilities as the professionals. The picture in Figure 16 visualizes importance of the service providers to the client's self-care.

Figure 16. A closer look in to the customer's view of services provided by the multi-professional care team.

The diabetes physician and nurse are core professionals to the client as they were in the professional's picture. The laboratory and distribution of medical supplies are central services to clients although these services are provided by other organizations. The client's relatives and peer support are important actors in the client's self-care. The multi-professional team is visualized in the outer circle as well as some medical analysis such as fundus photography or special care of additional diseases.

6.1.2 Communication and Interaction

The physician and the client have made a care plan. The personal care plan supports client's self-care to empower and prepare the client to manage his/her health and health care.

In the workshop of **the multi-professional care team** the members estimated the number of communication and interaction with the client. Connections between the client and the service provider's care team are described in Table 6. The planned visits are about 80 percent of client's connections with the care provider. The client's phone encounters are mainly with the physician and especially with the diabetes nurse. The phone encounters are used to solve patient's acute problems, adjust treatment and provide self-management support. Email is used seldom for security reasons. The client would like to use email more often but the professional can respond with only general answers. The outpatient ward encounters with the care team can be reached without a pre-scheduled appointment.

Ratio of clients communication and interactions with the service provider in a year
Planned visits, about 80% of connections
Physician 2-3 times/year
Diabetes nurse, 2-3 times/year
Podiatrist, 1 times/year
Dietitian, 1-2 times/year
Telephone encounter, about 10 % of connections
Physician, 0-2 times/year
Diabetes nurse, 2-4 times/year
Podiatrist, 0-1 times/year
Dietitian, 0-1 times/year
Email, about 5 % of connections
Physician, 0-1 emails/months
Diabetes nurse, 2-10 emails/ month
Team appointment on outpatient ward, about 5 % of connections

Table 6. The communicaation channels used between the client and the service provider.

The roles and tasks are defined in the multi-professional care team. The non-physician members of the care team meet the client more often than the physician. The service provider offers clinical case management services and most of all proactive follow-up through different service channels.

During the workshop the professionals discussed and took into account the outpatient ward visits without an appointment in addition to the planned visits, telephone encounters and

emails, the multi-professional team consultation meetings and supporting services like call center and booking services.

The professionals spoke of the indirect tasks concerning client's self-care such as documenting client's care process on the electronic medical record, writing prescriptions or referrals, consulting the municipal health care centers or sending a voucher to the medical supplies distribution office. This task was challenging because of the opening hours of this office.

One diabetes nurse mentioned that the health care system does not meet the client's everyday needs. She would be willing to have planned visits after office hours, but the organization does not allow it.

Two participants of **the experts of experience group** had insulin pump therapy. The sensors and other equipment related to the insulin pump was an important communication subject. The participants were familiar with their diabetes care and were able to manage their nutrition, exercise and insulin treatment so consequently the planned visits with the multi-professional care team were only on request.

Communication and interaction with the service provider
Planned visit every 3-6 months
Diabetes physician and nurse visits during the same day
Diabetes nurse's visit
Sensors from the diabetes nurse
Other vistis
Laboratory every 3-6 months
Podiatrist if needed
Specialized medical care if needed
Subjects for the telephone encounter
Acute questions asked from the diabetes nurse and physician
Questions about the insulin pump sensors
Email
Questions about the insulin pump sensors

Table 7. The clients view of the communication and interaction.

The clients are familiar with and committed to his/her care plan and they are managing their diabetes self-care. They are adapting their self-care and connections with the care provider to their everyday life. The clients receive case management and self-management support from the service provider.

6.1.3 Self-management Support and Client's Everyday Life

In the professional's workshop the members of **the multi-professional care team** visualized client's self-care and tasks concerning self-care and his/hers everyday life.

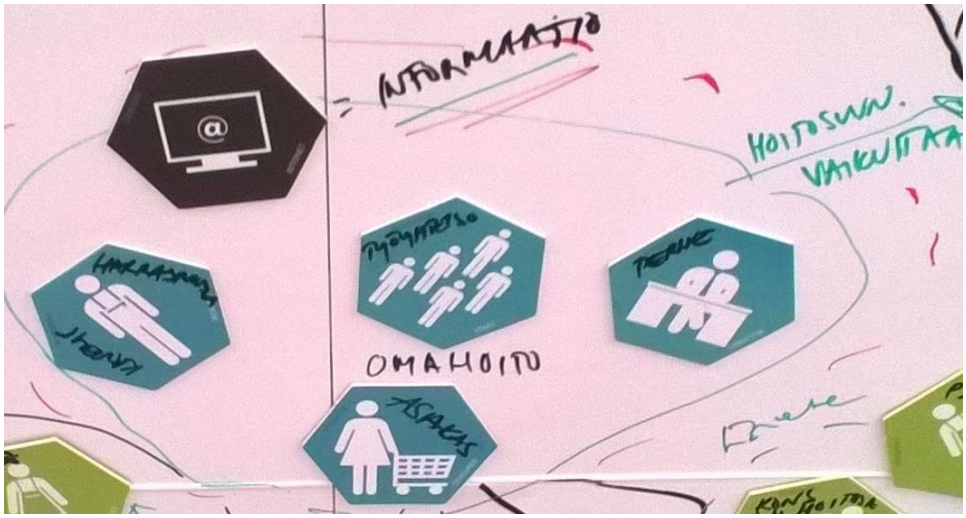

Figure 17. A closer look at the professional's view of client's self-care.

Client's everyday life, family, friends, hobbies and other interests, occupation and working environment form the foundation to his/her self-care. His/her everyday life affects his/her care plan and therefore affects his self-care.

The client is able to manage his/her self-care of type 1 diabetes. The self-care comprises taking care of medication and visiting the pharmacy. The professionals indicated that the national electronic prescription service has helped client's medication management.

The occupational health care offered by the client's employer offers an additional service for diabetes care as well as care and cure of other diseases.

Peer support and information on the internet are supplementary services for client's self-care. The Finnish Diabetes Association is a significant peer support provider and reliable information producer. The client or his/her kin can find both trustworthy and unreliable information on the Internet. Misunderstanding and incorrect interpretation of this information influences the communication between the client and health care providers.

There are many important resources and services for patients that are not part of the official medical system such as peer support groups, exercise programs and nurse educators. Dietitians do not offer services in small practices.

The client is well informed; he/she has good self-management skills and confidence to take care of his/her chronic disease. The community resources and services are one fragment of the Chronic Care Model. The community resources linked to health care provider processes can improve the outcome of self-care.

In **the experts with experience workshop the participants** visualized their tasks concerning self-care and his/hers everyday life with type 1 diabetes chronic illness. The self-care and the multi-professional care team and health care organization were surrounded by everyday life occurrences. The experts of experience have had type 1 diabetes for several years. The diabetes and self-care had become a part of their life.

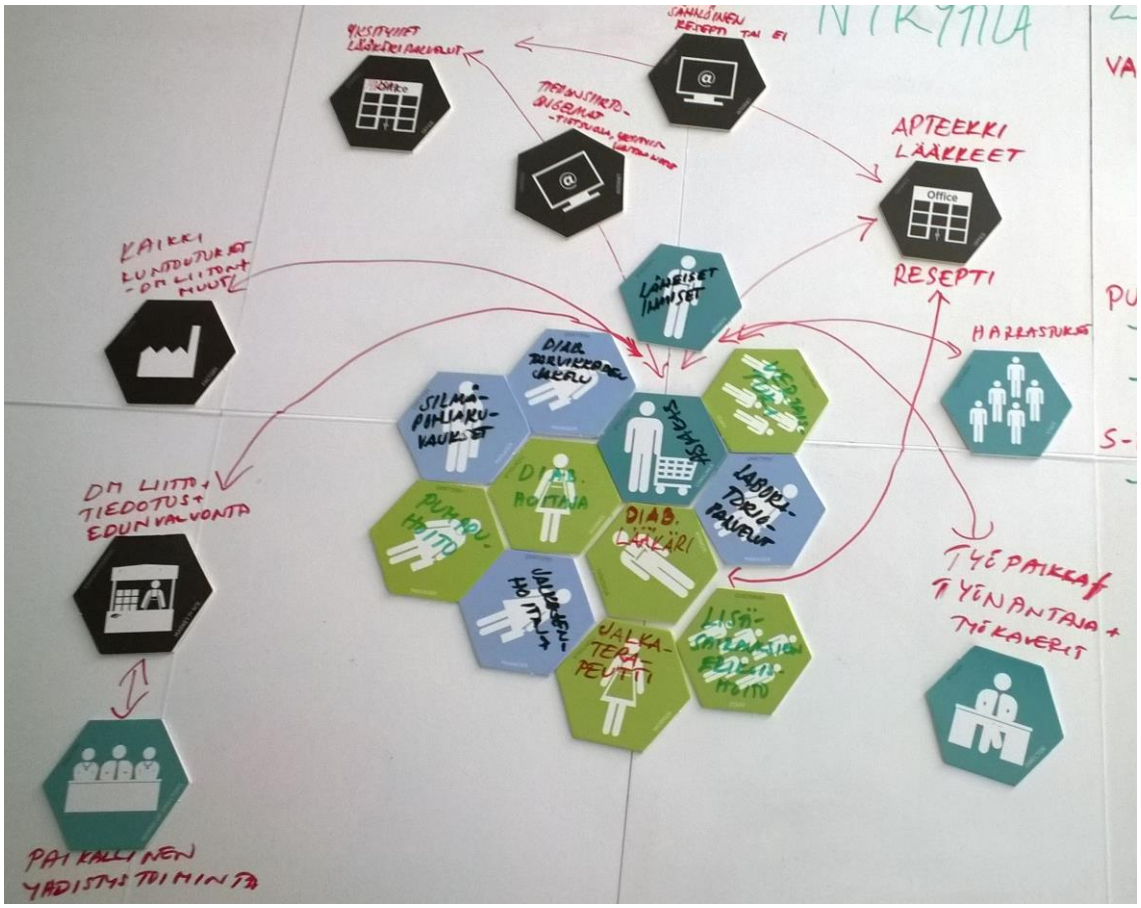

Figure 18. A closer look at the client's self-care and everyday life. The health care service is surrounded by everyday life occurrences.

The family, relatives and other close persons are important to the client, but they do not necessarily support client's self-care. The hobbies, other recreation activities undertaken by the client and the people met whilst undertaking the hobbies were important. Work, employer and co-workers were a part of their everyday life. The participants discussed how co-workers and employers can empower the person with a chronic illness. The employer can

misunderstand the importance of regular nutrition and self-care. One of the participants noted that she had to explain the difference between type 1 and type diabetes care to her employer.

One part of their everyday life was inform and teach family members, friends and co-workers about his/her type 1 diabetes and the care needed if he/she became unconscious was a significant topic in the workshop among the participants. They described that they have to inform and teach people every time they begin a new hobby or gain a new co-worker.

The occupational health services were an additional health care service to prevent other diseases. The private health care sector offered a channel to seek care, cure or treatment of other diseases than diabetes. They pointed out the difficulty to explain repeatedly his/her diabetes at a doctor's appointment. In their opinion their medical records should transfer electronically from the hospital to their occupational health care provider or to the private medical center.

The participants discussed their medical treatment. Two had an insulin pump and one had multi-injection therapy. The participant's narrative was about the insulin pump treatment with sensors and how it was stress-free to handle with the diabetes nurse. The electronic prescription had helped their visits to pharmacy. The medical supplies are distributed free of charge by the municipality health care organization. The distribution of diabetes medical supplies complicated their everyday life, because the opening hours were not suitable for people working full time.

The Finnish Diabetes Association was an important actor in their everyday life. The association offered knowledge, legal help, peer support and one could be an active member in the local association. The Finnish Diabetes Association offered adaptation training and rehabilitation.

6.1.4 The Service Elements of the Current State

The current state was analyzed concurrently by the professional's point of view as well as the experts with experience's perspective. These two perspectives form the findings of the current state. The data of the current state from WS 1 and WS 2 was transcribed and categorized by Chronic Care Model elements and service elements as a core, enhancing or supporting service. The core service of the current state includes Chronic Care Models Case Management and Self-Management Support. The service is mainly face-to-face operations or restricted to office hours in the form of planned visits and phone encounters.

The auxiliary services can be divided to enabling and supporting services. The enabling services are necessary for the core service such as Chronic Care Models Delivery System, prescription and pharmacy, laboratory and diabetes medical supplies services. The supporting services increase the value of the core service such as Chronic Care Models Clinical Information System, Community Resources and Policies, client's everyday life and occupational health services, peer support as well as professional's indirect tasks. The analyzed data is presented in the Table 8.

• **Core service** – CCM Case management – CCM Self management support – Reception operations (physician, multi-professional care team) – Outpatient ward services – Care plan, medication plan	**Auxilliary service** • **Enabling** – CCM Delivery system – Prescription, pharmacy – Laboratory – Diabetes medical supplies distribution – Special care of additional diseases • **Supporting** – CCM Clinical Information System – CCM Community recources and policies – Client's everyday life – Client's self-care tasks – Client's occupational and private health services – Peer support – Professional's indirect tasks

Table 8. The findings of the current state.

6.2 The New Service Model

The participants from both groups, the professionals and the experts with experience, were asked to visualize a new service model with the CoCo Cosmos play. The new element added into the play was eHealth compared to the current state. The participants in both focus groups had heard of eHealth solutions or had some experience of using one. Some of the participants were using social media solutions frequently. In the two separate workshops the multi-professional care team members and the experts with experience visualized the new model. The professional's visualized the new service model from the service provider's point

of view and the experts of experience visualized it how the client would use the provided service.

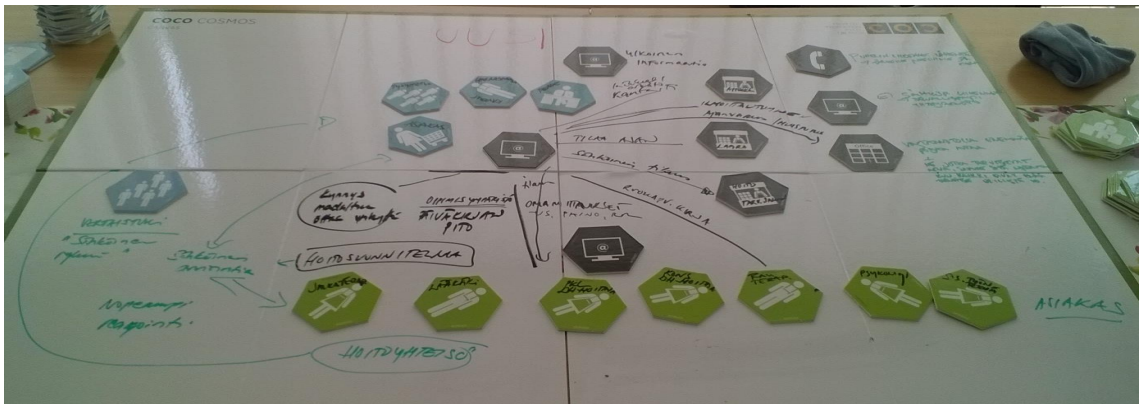

Figure 19. The professionals CoCo Cosmos play of the new service model for type 1 diabetes.

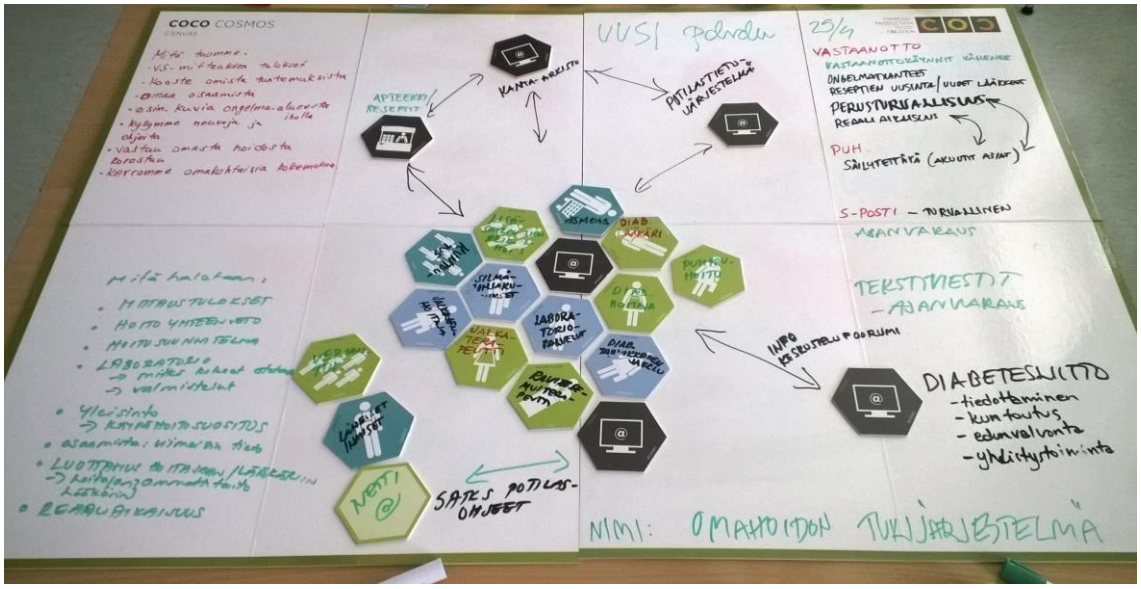

Figure 20. The experts with experience CoCo Cosmos play of the new service model for type 1 diabetes.

The photographs of the CoCo Cosmos plays in a bigger scale are presented in Appendix 5.

The following themes emerged from the analyzed data of the new service model:

- Communication and interaction
- eHealth as a service channel
- Delivery system
- Self-care and everyday life
- The Service Model for the new service

These themes are described in more detail in the following chapters. Each chapter has detailed findings from both workshops. These themes describe findings from the service provider's and the client's perspective.

6.2.1 Communication and Interaction

The professionals discussed that all service channels, planned visits, telephone encounters and outpatient ward visits are important and equal. They reckoned the secure eHealth service is the main service channel for customer interaction in the new service model.

eHealth was seen as an effective interaction tool because it was not bound to a health care facility or to office hours. The multi-professional care team is available around the clock. The client can pose a question or import information at a suitable time for him/her. The professional can answer it between his/her other duties. The participants of the professional's workshop commented on the easiness of interaction. They believed the client would be more willing to contact the multi-professional care team than in the current state.

The customer chooses the service channel based on his/her needs and decisions. The professionals were pondering a situation where the client chooses the channel, then he/she only calls or visits the diabetes nurse, physician, dietitian or podiatrist occasionally. They compared the situation to eBanking. The customer uses eBank services and visits the bank branch only based on his/her needs and decisions.

The new service model changes work routines. The participants of the multi-professional's workshop noted they will have more time at the planned visits when the client has measured and documented their measurements in advance with the eHealth service. The professionals assumed the intercourse with clients will change when all the routine subjects are managed on the eHealth service. The phone encounters were supposed to transfer to communication in the eHealth service. Therefore the professional presumed they will have more time for time-consuming and difficult subjects with the customers.

The new service model affects the Chronic Care Model. The interaction between the customer and the professional is done with the eHealth service. The self-management support becomes an important element in the care process. The interaction at the planned visits focuses on the client himself and on his/her problems. The planned visits concentrate on case management and customer relationship.

In the eHealth service the accessibility and interaction aspects are merged into one communication element in the process. The communication can be one or two-way communication. In the eHealth service the information is a critical element as it supports the core service as well as enabling and supporting services. The client is an active participator in the service.

6.2.2 eHealth as a Service Channel

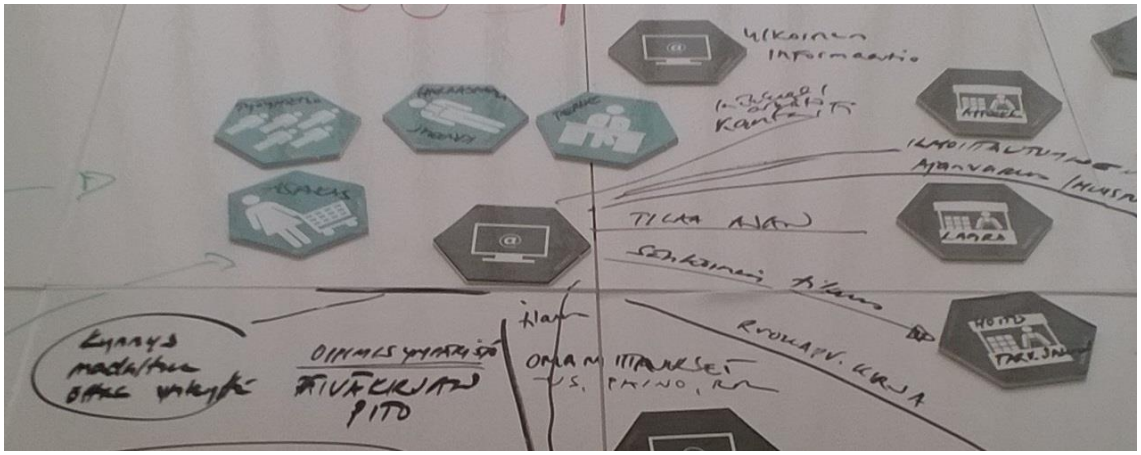

Figure 21. A closer look at the professional's view of eHealth as a service channel.

The eHealth service makes the client's health and care plan visible and eHealth allows the plan to be a part his/her everyday life. The mid-term review about how the client's self-care has been realized is could possibly be an online interaction between the client and the multi-professional care team members.

Reliable and evidence-based information is crucial to the eHealth service. The participants stated the importance of educational material. They posed the idea of linking an eLearning environment to the eHealth service. The reliable information is important to share with the client because the internet has a lot of evidence-based information as well as unreliable and false information. eHealth was seen as an accurate service channel to answer client's personal questions and correct misconceptions.

The client becomes a content producer for his/her eHealth service. He/she produces information about his/hers self-care and related measurements. He/she completes his/her diary and updates any comments. He/she can maintain a nutrition and exercise diary. The client can decide what information he/she publishes to the care team members from the information provided by the client.

The clients use social media as a part of their communication and everyday life. The peer support groups and forums are on the internet. The Finnish Diabetes Association produces reliable information on the internet.

The functionalities of the eHealth service facilitate the customer's and the professional's everyday life needs. The online booking solution and electronic registering services can be integrated into the eHealth service. The participants pointed out the necessity of a solution for more effective medical supply distribution. The diabetes nurse could produce a voucher for the client who could then easily order the diabetes medical supplies.

The professionals pointed out the requirement for a secure eHealth solution. They appreciated the secure messaging and reminders. The notifications and reminders support the client in implementing his/her self-care. The ePrescritpion and eArchive services complement the eHealth service and client's everyday life.

The participants of the experts with experience workshop discussed the easiness that eHealth would bring to their everyday life. They experienced eHealth as one service channel among the others. The presumed eHealth would be a channel to interact real-time with their multi-professional care team members. The secured messaging with the multi-professional care team was regarded as being very important.

They expected that eHealth helps them to book an appointment with their diabetes physician, nurse or some other member of their multi-professional care team. The short message service (SMS) is a useful addition to the booking service. Some of the participants had participated in a pilot project where appointment reminders were sent by SMS message.

The experts with experience visualized the use of new service in their everyday life and the importance of the information as one element of the service. The clients are willing to read more information about laboratory samples. They expect to have more information about how to prepare oneself for laboratory sampling and if the blood sample requires the client to fast. The other topic was concerning laboratory test results. The clients expected to see their test results and the interpretation on the eHealth service.

The professionals and clients experienced the eHealth as a tool to solve everyday life difficulties with diabetes medical supplies distribution. They expected to be able to order the supplies granted to them or contact the unit online.

6.2.3 Delivery System

Figure 22. A closer look at the professional's view of communication between the customer and multi-professional care team members when eHealth is added to the service.

In the workshop the participants of the multi-professional team stated that the connections, responsibilities and communication between the multi-professional team members corresponds the current state. In the picture in Figure 22 the participants visualized the multi-professional care team side by side in a row and with eHealth positioned above this row. This image might be coincidence but in the other hand it presents eHealth as facilitator to direct interaction between the client and all members of the care team.

The customer relationship emerged from the analyzed data. Participants of the professional workshop discussed the importance of knowing their customers and their lifespan, and vice versa, the clients should know their own multi-professional care team. The new service model with the eHealth service brings the care team closer to the client's everyday life.

The care team forms a safety net for the client. The participants exchanged opinions of client's self-management support and how they can support the client to take responsibility of his/her wellbeing and self-care. The client's lifespan combined with the acceptance of their chronic illness seemed to be a turning point for client to take responsibility of his/her self-care.

The new service model guides the client to take greater responsibility for his/her self-care than in the current state. The client implements information about his/her self-care such as diary notes, measurements, questionnaires and poses questions with secured messaging.

He/she is as active a co-producer of the eHealth service as the professional is when commenting or reviewing the content provided by the client and answering to him/her.

During the CoCo Cosmos play of the new service model the participants noticed that the well informed customer was a member of the care team. The multi-professional care team and the client formed a group similar to a work community where all members are equal. In the end of the play session the professionals wrote 'client' in the same row as where the multi-professional team was visualized (In Figure 22 the word "Asiakas" 'client' in Finnish, is circled in an orange color).

In the new service model the client is a member of the care team and an active player taking care of his/her chronic illness as a part of his/her everyday life. The analyzed data showed the client's active role as a self-care supporter and a member of the care team which the researcher did not know how to classify according to the Chronic Care Model elements.

The professionals proposed that the eHealth service could support the consultation between organizations when the client is transferred from a central hospital to the municipality health care center. They were discussing the changes that the new service model will make to the organizations' processes. They stated that the multi-professional team is used to support the client's self-management. The operational change will be greater for the physicians.

6.2.4 Self-care and Everyday Life

In the workshop of the experts with experience the participants were discussing self-care, self-management and everyday life. The analyzed data demonstrates the expectations of the service providers, how the client produces information and how they are an active participator in the service.

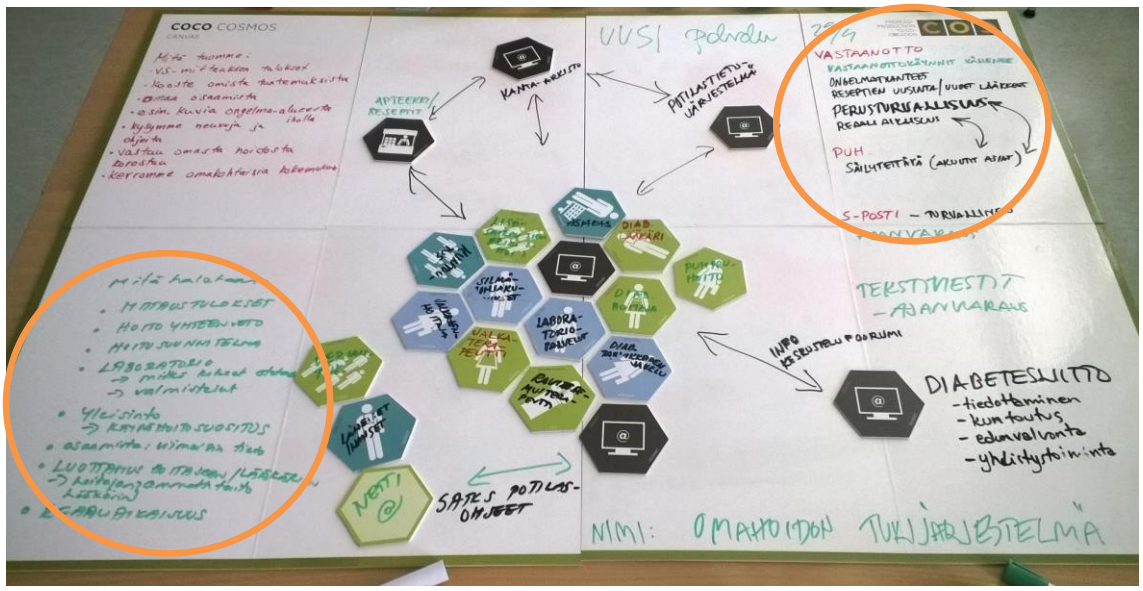

Figure 23. A closer look at client's self-care and everyday life.
The health care service is surrounded by everyday life occurrences. The expectations are written on the board and circled in orange in the figure.

The clients expect expertise from the multi-professional care team. The multi-professionals' care team member is an expert of his/her profession. He/she has acquired the latest information and can apply it to benefit his/her client's. The customer believes in and trusts his/hers care team and health care provider. The customer relationship between the client and the professional provokes the safety and security the client feels towards the care and treatment of his/her chronic illness.

The participants of the experts with expertise workshop presumed that eHealth is used mainly when the client can choose the service channel from his/hers premises. The client interacts primarily with diabetes physician and nurse. They stated the client chooses planned visits to solve problematic situations, to renew prescription medicine or to discuss an admission note. The client chooses a planned visit, outpatient ward visit or telephone encounter if he/she experiences a need for a real-time interaction with the service provider. He/she contacts the dietitian, podiatrist or a private pedicurist when needed. The participants expected the planned visits to decrease and use of eHealth to increase when the client can choose the service channel.

The data analyzed from workshop three confirmed that the new service model supports self-management support. The client and his/her diabetes physician and the multi-professional care team members collaborate to produce his/her care plan. The client expects the multi-professional care team to analyze their measurement values and publish the treatment

summary. They assume the professionals include subjects such as carbohydrates, pump treatment and sensors in the eHealth service.

The eHealth service forces the client to document his/her self-care and the measurement values and nutrition diary related to his/her care plan. They have a channel with which to interact and ask questions about the pump treatment or other matters related to chronic illness and his/her care plan. The service provider's patient information and the clients personal guiding is published on the eHealth service. The new service motivates the client to become a co-producer of the eHealth service.

The client's family members are a huge support but they do not necessarily provide a sense of security about how to treat the chronic illness. The Finnish Diabetes Association is an important and reliable information publisher and a local and national actor. It communicates the benefits and rehabilitation to which their members can apply. This reliable association with peer support groups and information creates the sense of security. The eHealth service lowers the threshold to seek information on the Internet and on peer-support groups. The participants noted that besides the reliable information the internet has, it also has a lot of unreliable information. The eHealth service enables an easy channel for the client to pose questions online so the multi-professional care team can correct possible misunderstandings and reflect their responses as personalized information. The client becomes more able to understand his/her condition and what is good for him/her.

The participants of workshop three described the new service to motivate the client. The professionals and clients are equal users of the service and they bring their knowhow and provide personal information to the service. The service highlights the client's responsibility of his/her self-care. The participants named the service "Self-care Support Service".

6.2.5 The Service Elements of the New Service

The data for the new service model from WS 3 and WS 4 were categorized by service elements: core, enhancing or supporting service. The new service model was analyzed from the professional's point of view as well as the experts of experience's perspective. These two perspectives form the findings of the new service elements revealed in Table 9.

The new service model inspires the client to become an active performer in the service. He/she decides from his/her perspective when to contact the service provider and which channel fulfils his/hers needs. The client as an active player becomes a member of the care team. In the multi-professionals' care team members workshop one participant said: "The client becomes a member of the team, like in a workplace".

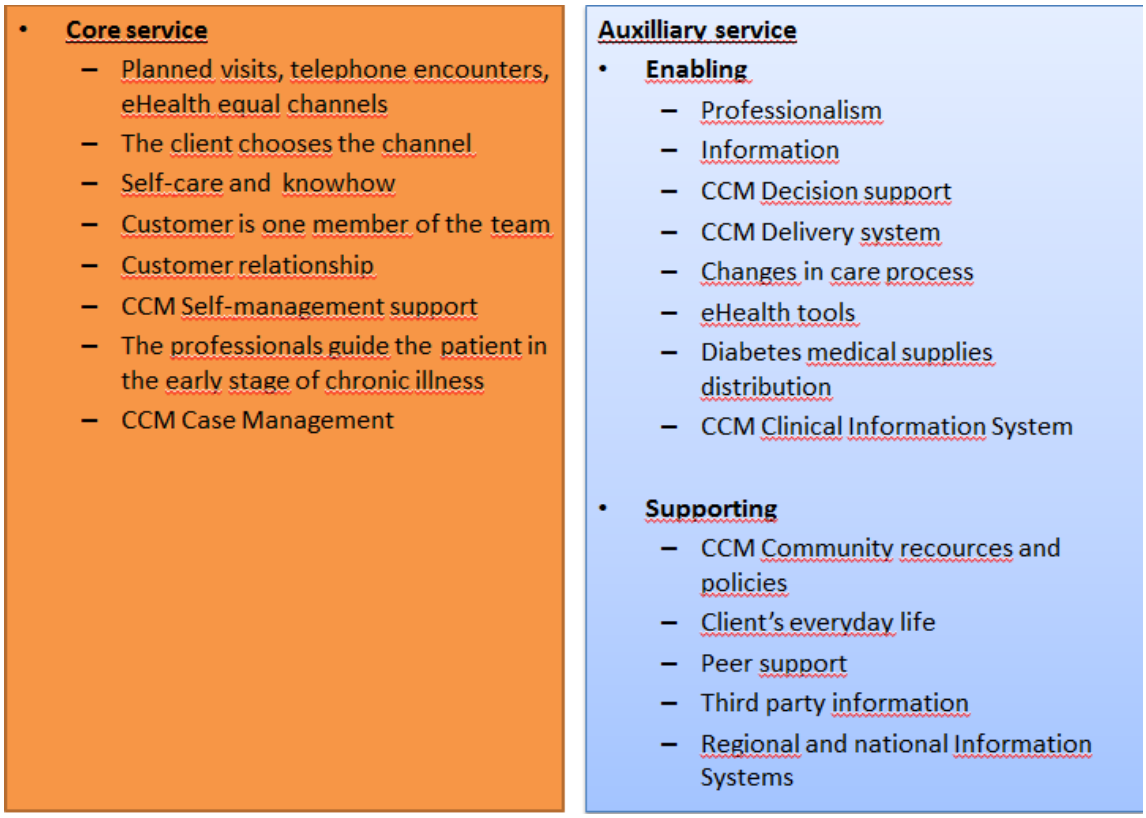

Table 9. The service elements of the new service model.

The auxiliary services contain information and knowledge. The professionalism and Chronic Care Model decision support are important elements. The core service affects the enabling services. The elements which support the core service are related to Chronic Care Model Community resources and policies, peer support, third party information and the client's everyday life such as family, hobbies and the workplace.

6.3 Blueprint of The New Service

In the third workshop the participants were from both focus groups. The multi-professional care team (diabetes nurse, dietitian and podiatrist) visualized and worked together with the three members of the experts with experience group.

The task for the third workshop was to envision a customer journey using the new service model from diagnosis up to twelve (12) months of care management, self-management support and self-care of type 1 diabetes.

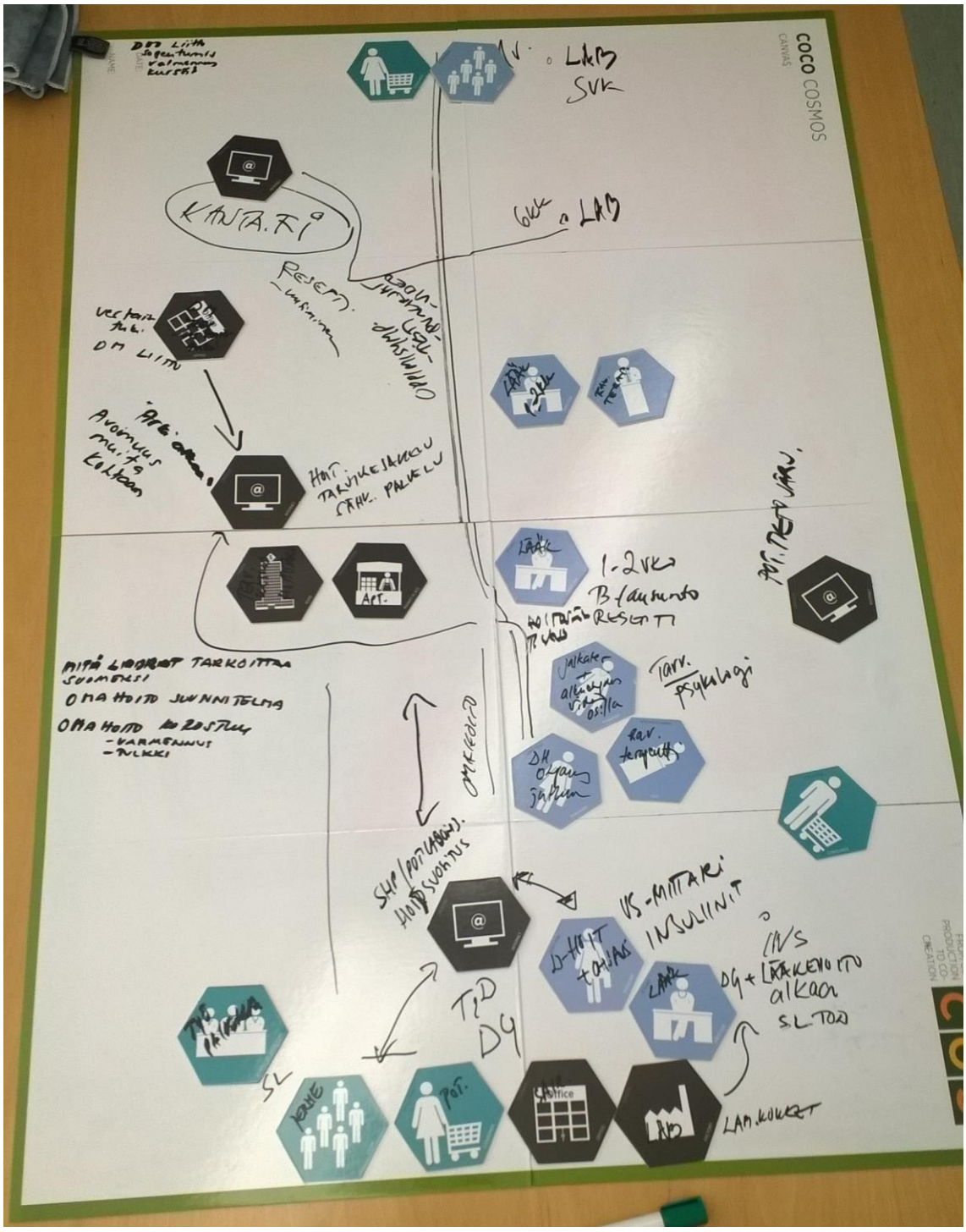

Figure 24. The CoCo Cosmos play and the customer journey visualized in the third workshop.

The participants illustrated the intensive early stage during which the illness is diagnosed. A person seeks medical advice and books an appointment to a physician of an occupational health care or at the community health care center. The physician sends the client for further

examination by a specialist at a hospital. The client is in bad physical condition, confused and scared.

The customer is seen as a patient at an outpatient ward or in the hospital. The delivery system follows the evidence-based procedures of the organization. The physician leads the diagnosis procedure and several laboratory tests are taken. The physician signs necessary documents such as the sick leave report document. The insulin medical treatment begins. The patient has a planned visit to the diabetes nurse. The diabetes nurse guides the patient in how to take care of the insulin medication on his own and supervises the use of a blood sugar meter, counting the carbohydrates and how to proceed with a normal life. The client has a prescription and visits the pharmacy. The diabetes nurse signs a diabetes supply voucher. The client registers with the medical supply distribution solution and collects the assigned supplies from a pre-arranged location.

The client lives at home and has several planned visits on the outpatient ward with the physician, diabetes nurse and the multi-professional care team members. The physician and the client discuss and conceive together his/her health and care plan. eHealth is one channel to interact between the client and care team. The client seeks information to read more about his/her chronic illness, interpret the information obtained from the health professionals and to share with his/her family members. The client takes care of his/her medication and ensures the availability of diabetes medical supplies he/she is using daily. Taking into consideration the Chronic Care Model elements, this period incorporates care management, and self-care management support becomes more prominent when the client is conquering self-confidence issues and taking more responsibility for his/her self-care.

The client is ready to speak openly about his/her illness to his/her friends, colleagues, workmates and people they meet at their hobbies. The client performs his/her self-care using the care plan. eHealth tracks the client's self-care, measurement and presents test results. It is as equal a service channel to interact with the care team as telephone or planned visit. The eHealth solution is connected to an eLearning platform. The information and decision support becomes an important element. The Finnish Diabetes Association provides information and peer-support to the client. The client is competent and capable of taking care of his/her chronic illness. He/he chooses the service channel from his/her premise to interact with the physician and the multi-professional care team.

The participants discussed that people are individuals when it is matter of feeling like a homelike being-in-the-world. One criterion to define the client's readiness was related to the client's ability to narrate his/her chronic illness and to coach family members and workmates in what to do if he/she would become unconscious due to hypoglycemia.

The blueprint construction began with identifying all service users from the picture visualized in the client's workshop.

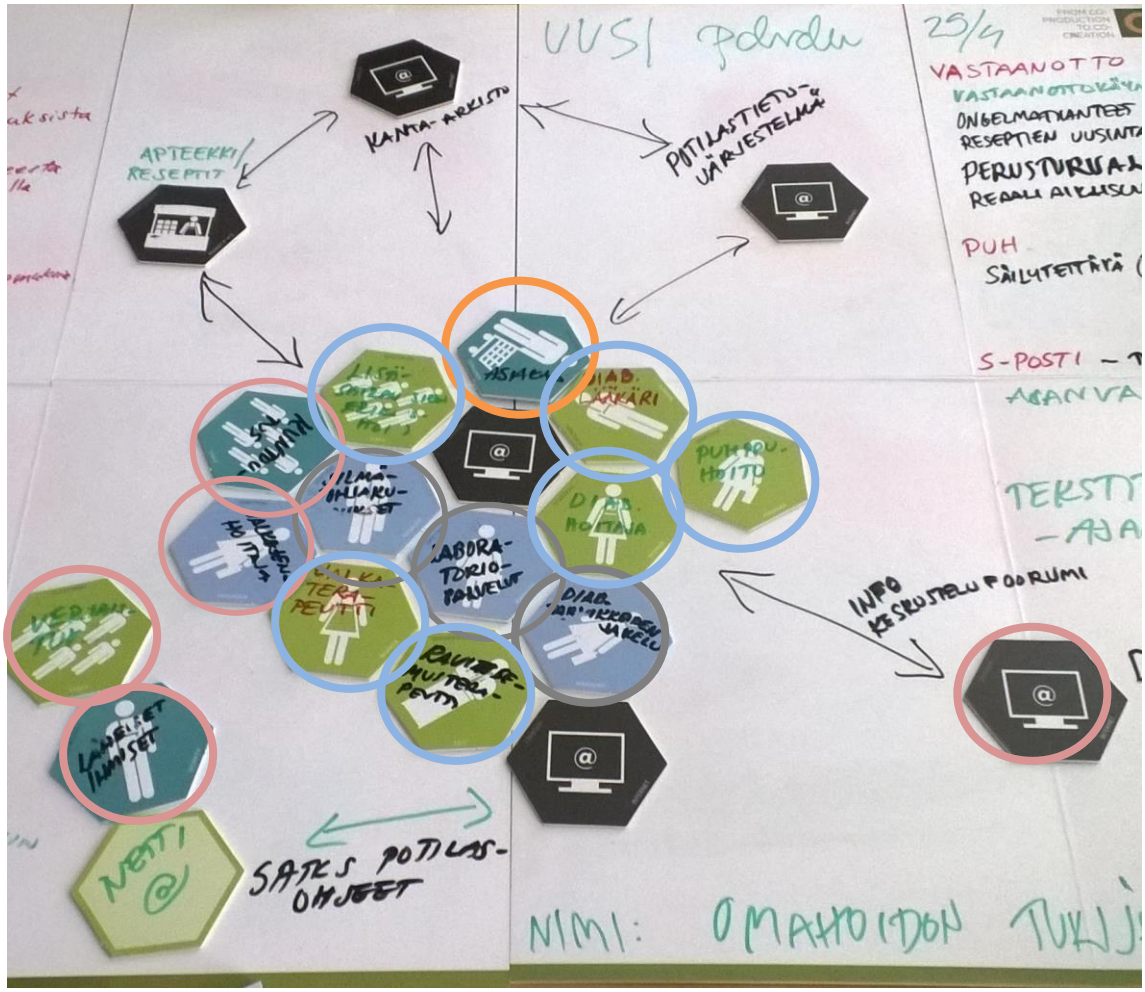

Figure 25. The actors of the new service.

The actors of the new service were divided into four groups: the client, the health care service provider, the regional health providers and other actors in the service. The client is an important service user. Looking at Figure 25, other users than the client (marked in orange) are divided into three groups: the users of the Satakunta Hospital District (marked in light blue), regional health care providers (marked in grey) and those users who provide enabling services to the client (marked in pink). The backstage actors are not marked.

In the workshops the users of the service from Satakunta Hospital District were cited as diabetes physician, diabetes nurse, dietitian and podiatrist and specialists for preventing additional illness. The users from regional health care providers were mentioned as Satadiag laboratory and fundus imagining staff, municipal health care centers, medical supplies

distribution office's and local pharmacy's professionals. The third group consisted of those actors who provided enabling services to the client. They were named as family members, friends, workmates and the services the client purchases privately such as pedicurist. The services Finnish Diabetes Association provides such as adaptation and rehabilitation courses, peer support, information and legal help were included in the third group. Usually other actors were seen as enablers of the service. The third group members were seen as service users in an enabling manner for the client. The backstage actors were identified as local, regional and national health care solutions and the internet.

The users of the service were color coded as in Figure 25.

Client - orange
Satakunta district hospital staff - light blue
Regional health care providers - grey
Other players - pink
Backstage actors – purple

Table 10. Sorted and color coded service users.

The second task in the service blueprint construction was to define stages of the service life cycle of the new service model. Løvlie, Polaine & Reason (2014, 98) defined typically used service phases: aware, join, use, develop and leave. The Chronic Care Model supports the health care provider's processes and the model is customer-oriented. In this study the service life cycle was combined and modified unrestrictedly with the typically used service phases were combined and modified unrestrictedly with customer experience and the Chronic Care Model as Service provider's offerings as shown in Table 11.

The service phases of the new service model		
Service phase	Customer experience	Service providers offering
AWARE	Seeks for cure/care	Diagnose
JOIN	Learning self-care of chronic illness	Case Management
USE	Confident on self-care	Self-Management Support
DEVELOP	Motivated service user	Customer Relationship Management
LEAVE	Moves to an other region	Customer Relationship ends

Table 11. Service phases of the new service model.

The third task was to design a blueprint grid in a Microsoft Excel worksheet. The user groups and single users were placed on the vertical axis at the left of the worksheet. The service life cycle was positioned on the horizontal axis at the top of the worksheet. Each service cycle

was divided into user groups: Health care service provider (HSCP) which in this study was Satakunta Hospital District, regional health providers, other actors and backstage services. After this procedure, service channels offered by the service provider were analyzed and placed on the worksheet.

The fourth task was to map a single user's actions per service phase in the blueprint. In the earlier workshops about the new service model the participants had perceived user actions on a larger scale. The idea behind making a blueprint was to capture the overall picture of the service and map the various touch points. Health care services have several touch points and many actors in the service. The blueprint became very complex and was challenging to build. The user actions defined in the workshops were task-based activities and were seen as a mixture of customer and user experiences as well as service provider's experiences. The service providers, the staff were understood to be simultaneously service deliverers as well as service users. The user actions and touch points were mapped in the blueprint instead of filling in the user experiences. (Løvlie et al. 2014, 102, 131-134).

The mapping procedure was carried out manually. Each service phase was filled in individually. Each user action was filled in as user's touch point to the service.

Table 12. The blueprint of the service.

The blueprint exposed the complex service concept with four service phases and multiple users from different health care service providers, other actors and supporting backstage activities. The blueprint demonstrated the action points, interaction and relationship between each user as envisaged by the participants of the third workshop. The blueprint is split to service phases for technical printing reasons and presented in Appendix 6.

A closer look into one service phase, such as the Learning self-care of a chronic illness / the Case Management service phase, revealed the customer's active participation as an user of the service. The diabetes physician and nurse support the client in his/her self-care. The customer has several touch points with all actors of the service. He/she has numerous touch points with the health care provider and with the regional health providers. The laboratory and pharmacy play an important part in building the user experence. The members of the experts with experience group explained in their workshop that their family members do not necessarily support the client in his/her self-care but instead ask several questions.

Service Phases and		Learning self-care of chronic illness / Case Management (1-2 weeks to 3 months, personal)					
		Health care servcie profider (HCSP)			Regional HCSP	Other actors	Backstage
		Face-to-face	Phone	eHealth	Face-to-face	Face-to-face	
Customer	Customer	Client has several planned visits and tasks: Physician, nurse, dietician, podiatrist	Calls and ask if sudden problems: nurse, physician	Read information, learn, measure, fill-in questionnaires, follow-up, ask for support, see lab results and interpretation and book planned visits. Makes an order for supplies. Gives permission to the occupational HCP to use eHealth.	Goes to lab for tests, pharmacy for medication. Registeres to the eDistribution. Goes to distribution center for supplies. Visits the occupational health provider.	Explains, answers questions to family members. They are supporting client. Returns to work, answers workmates questions.	Read information on the internet, Duodecim, Finnish Diabetes Association, visits Peer support groups
Health care service provicer	Diabetes physician	Health and care plan, normal care path check-up, signs referrals, builds up trust and customer relationship	Answers clients questions on phone	Health and care plan published, answers questions			Duodecim information, decision support , EHR, LIS, ePrescription, Kanta,
	Diabetes nurse	Care coordinator, normal care path check-up, Guidance, insuline treatment, teaches the use of blood sugar meter,orders medical supplies, builds up trust and customer	Answers clients questions on phone	Guidance, answers questions, follow-up and support the client self-care			Duodecim information, Decision support , EHR, LIS, ePrescription, Kanta,
	Dietitian	guidance, carbohydrates		instructions, follow-up diet diary			EHR, Decision support on the Internet
	Podiatrician	guidance, feet					EHR, Decision support on the Internet
	Psychologist	On demand					EHR, Decision support on the Internet
	Social worker	On demand					EHR, Decision support on the Internet
	Specialist - additional illnesses	On demand					EHR, Decision support on the Internet
ider	Laboratory			laboratory results and interpretation	lab test and analysis		LIS
					Medication		

Table 13. A closer examination of one service phase of the new service model concept.

The user experience during the whole service life cycle can be inspected with a blueprint. Each life cycle can be analyzed into a closer service life cycle. Each box of the blueprint can be opened as a new blueprint to this particular service touch point. A closer look at any one of the user experience, life cycle or single boxes of the blueprint was excluded from this study.

Designing the blueprint of the new service model clarified the service life cycle and service phases as well as single servcie touch points. The entirety of the servcie model was easier to perceive from the blueprint although the service model is a complex one. In this study the blueprint was the analysis and conclusion of the new service. The blueprint offered a framework to categorize a complex network and the service touch points. The blueprint mapped the construction of the service and connected all the service channels and touch points to a customer journey.

6.4 The Key Features of the New Service

eHealth was noted to be the main service channel to health care services. The findings demonstrated the professionals are willing to guide the use of eHealth to the client and coach him/her online from the diagnosis phase. The clients and the professionals emphasized the importance of all the service channels of the user-centric service. The clients and professionals expected the customer connection to become deeper and meet the client's needs trustfully even though the interaction took place online. Personal support was important to build up, as well as trust and personal relationships with the customer.

A positive outcome of this study was finding that type 1 diabetes care can be digitized. The new service model is client-driven and it digitizes the client's self-care and interaction between the client and multi-professional team. The new service model digitizes the professional's processes of care, coaching and support. The service is utilized by individuals, care providers and other actors of the service. eHealth is embedded in the service process and relied upon by all users of the service.

In the new model eHealth was seen as the main channel of the service. The conventional phone call and planned visit are important channels and necessary for acute or problematic situations. The multi-professional team raised two important factors of the new service model. These factors were customer relationship and team work with the client. The client's self-care involved a continuous flow of interactions between the client and the multi-professional care team. The continuously rendered service created a sound relationship between the client and the service provider. The participants valued the customer's ability to choose when to contact the health care provider and through which channel.

The new service model can be reduced to six main findings. The key findings are presented in the following chapters.

6.4.1 Service Experience Is Holistic

The experts with experience as well as professionals visualized and experienced the service as one holistic service. The new service concept consisted of actors from different organizations as well as other actors that took part in the service.

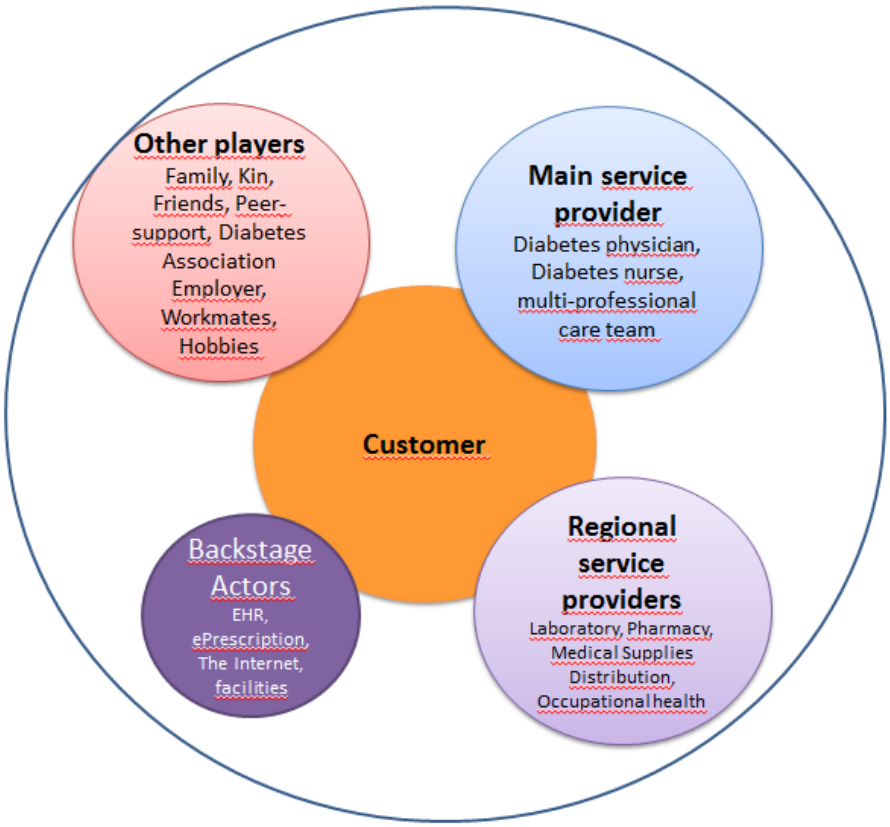

Figure 26. The holistic service experience depicted as a circle.

6.4.2 The Client Is a Member of the Care Team

The new service concept elevates the customer to become a member of the care team. They are using eHealth and are confident and capable of self-care and self-service. The client acts partly as a co-producer of the eHealth service and this action enables the client's value-creating process.

6.4.3 The Client Chooses Which Service Channel to Use and When

The client follows and executes his/her health and care plan. He/she decides when he/she uses eHealth, needs a telephone consultation or plans a visit with the physician and/or the multi-professional care team. The participants compared the new service model to eBanking services.

6.4.4 The Service Experience Is Unique to the Individual

During the workshops the participants identified the individualism of clients. In the new service model some clients can assimilate a self-care plan during the first 12 months from diagnosis. Some clients will take a longer time to assimilate their plan and some clients will be unsuited to eHealth. The client can choose to be guided in face-to-face meetings.

6.4.5 The Importance of Information

The internet has augmented the information sources available to customers and professionals. This information overload, weather it is reliable and unreliable in relation to the care process, affects the interaction between customer and service provider. The participants experienced eHealth as a useful tool to personalize the information flow, to meet the customer's health and care plan and to answer questions and guide the client.

6.4.6 The Integrated Service Offering

The findings suggest the net offering to be connected to the augmented service model in one service concept. The augmented service with a net offering is connected to the customer's benefit. The elements of the two service offerings are inspired by Grönroos (2007, 187, 200) and are shown in Figure 27.

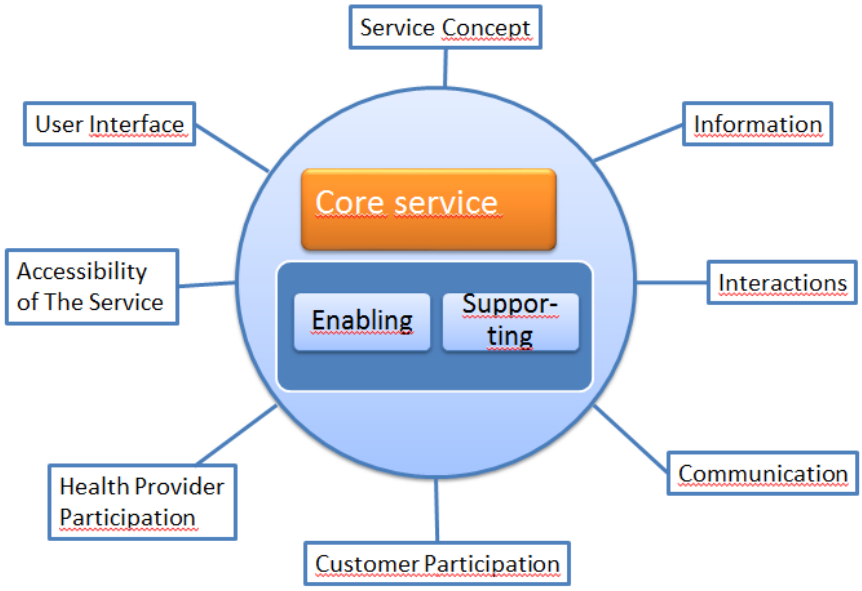

Figure 27. Service concept with a net offering and an augmented service offering.

The client experienced the service as a comprehensive service with several providers. The core service was not bound to the main service provider or Chronic Care Model. The experienced added value and was meaningful to the user. The participants thought eHealth was an agile channel to interact between clients and professionals and added value to both of them.

The multi-professional team expressed the situation where the client was a co-producer as **"The client is a member of the care team and a workmate to us"**. Individually designed services engage the client in his/her self-care and readiness to self-service. It adds value to the client's everyday life. The experts with experience described the service as **"A Self-care Support Service"**

7 Discussion

The client-driven service model for type 1 diabetes care is based on the theoretical concepts of this study; eHealth, Chronic Care Model, self-care and service design and management. The new service adds value to the client and to the health care provider as well as integrating eHealth to the service offering.

Action research was a suitable methodology to systematically plan, act and reflect on the development process as well as to understand the underlying problems. In the co-creation workshops the participants, the experts with experience of type 1 diabetes and the members of the multi-professional care team from Satakunta Hospital District, were active players and

added value to the innovation process. The researcher acted as a developer who facilitated the co-creation workshops, documenting the process and collecting the data. The CoCo Cosmos play was seen as a tool for a mini-intervention in the organization. (Coughlan & Coghlan 2002; Eriksson & Kovalainen 2010, 194-196, 198; Koivisto 2009, 49, 142-145; Moore et al. 2012). In the workshops the participants discussed and reflected on the real world services while playing and embodying the current state with the CoCo Cosmos tool. In the second phase of the workshops the participants created the new service model with the eHealth component.

In the third workshop the participants envisioned a customer journey from diagnosis up to twelve months of type 1 diabetes care with the CoCo Cosmos tool. The researcher constructed a blueprint of the new client-driven service where eHealth was the main service channel. The blueprint comprised several actors and organizations that provided services to the client and it was divided to typical service phases which projected the customer's experience of self-care and the service providers offering based on the Chronic Care Model stages. (Løvlie et al. 2014, 102, 131-134).

The CoCo Cosmos tool was easy to instigate, play and use. This tool covered the co-creation phenomenon from value co-creation, coproduction and collaborative of the service development aspects (Laurea 2013). The innovative method was seen to help the clients and professionals, commit to the service. The blueprint demonstrated touch points, actors, service elements and the service life cycle over a period of several months and it revealed customer and user experiences as well as service provider's experiences. (Løvlie et al. 2014, 102, 131-134).

The collected data, the photographs taken of the five CoCo Cosmos plays, represented a visual outcome of the co-creation workshops. The data was explored as an integral part of the service model, organizational context, routines of work and by the thematic literature. The data was analyzed using a data source triangulation and deductive analysis. (Atkinson & Delamont 2005, 824-826, 827; Erikson & Kovalainen 2008, 293).

The findings correlated with the theoretical concepts of the study. The study combined service perspective with Chronic Care Model, self-care and eHealth in the theoretical framework. Additionally the innovative methods used in data collection were merged with qualitative data analysis. The multi-disciplinary and multi-methodical approach enabled a deeper understanding of the user-centric service model of augmented service offering with integrated eHealth. The blueprint of the service clarified the complex service model with several actors and organizations.

The findings demonstrated the current state was based on the delivery system and the interaction between client and service provider which took place during planned visits and telephone encounters. The service offering of the current state was bound to a health care facility and to office hours. The type 1 diabetes care process was based on the health provider's health plan and the actions and care sessions were independent events. The patient's role, as a client in healthcare, was based on the organization's processes and profiles. The findings of the current state correlate with earlier studies (Leimumäki & Päräkkä 2012, 11, 15-19; Lillrank 2010, cited in Groop 2012, 11-12).

eHealth was the main service channel in the new service model. The conventional phone call and planned visit were important channels to the client and necessary for acute or problematic situations. The client had the opportunity to become an active user of the service. The findings outlined client's freedom to choose the service channel added value to the customer and engaged and motivated the client. The service encouraged the client to manage his/her everyday life with type 1 diabetes as sited in the earlier studies. (Jäntti 2008, 47-61, 168; Leimumäki & Päräkkä 2012, 11, 15-19). The number of planned visits was expected to decrease and use of eHealth to increase. The expectations correlated with the results of earlier studies like in the Renewing health project a constant trend for reduction of the HbA1c and a lower number of outpatient visits was demonstrated (Andersen, Aletras, d'Angelantonio, Dafaulas, Fasterholdt, Jensen, Kidholm, Kotzeva, Lange, Lindberg, Mancin, Pedersen, Ribu, Scharf, Stafylas & Wanscher 2014, 2, 10, 37-40).

The professionals and clients were equal users of the service and they brought their knowhow and provided personal information to the service. eHealth was seen as a facilitator of direct interaction between the client and members of the care team. The customer relationship, importance of knowing the customers and their lifespan emerged from the findings. The multi-professional care team and the client formed a group similar to a work community where all members were equal. The findings of the new service model correlated with Grönroos (2007). The client was an active participant and acted as a co-producer in the service. This action enabled the client's value-creating process. The accessibility and interaction were merged into eHealth solution where the information was a critical element as it supported the core service as well as enabling and supporting services. (Grönroos 2007, 199-201).

eHealth was seen as an agile channel to communicate. The clients expected the multi-professional care team to be experts on their profession. The new service involved a continuous flow of interactions between the client and the multi-professional team. The continuously rendered service created a sound relationship between the client and the service provider like Grönroos (2007, 57, 190, 199) has pointed out.

In a recent study showed that the number of an eHealth service user's could be increased if the clients were engaged to use the eHealth service on a planned visits and it is integrated into the care process (Bello, Cohn, Etz, Kashiri, Krist, Longo, Loomis, Peele, Rothemich, Sabo & Woolf 2014, 418). In this study the new service model was compared to and reflected with eBanking services in Finland. The situation in the health care sector was seen similar to the early 2000's when the Finnish banks were developing and deploying eBanking services as Enders, Hungenberg, Jelassi & König (2006) outlined in their study. Online banking was integrated within physical banking operations to avoid competition. The integrated business model made it possible for customers to choose the service channel. The bank branches, customer appointments and personal support were important for building trust and personal relationships with the customer and to reassure them of the possibility of a face-to-face service. (Enders, Hungenberg, Jelassi & König, 2006, 67-77).

Grönroos (2007, 187, 200) has introduced the augmented service offering and the net offering separated. In the new service model the augmented service offering was integrated with net offering as one holistic service that created added value to the client as well as to the professional. Løvlie et al. (2014, 98, 102, 131-134) propounded the blueprint as a useful tool to envisage a service phases and user experience. The blueprint demonstrated the complex multi-organizational service offering of the type 1 diabetes care. The typically used service phases, aware, join, use and develop, were consistent with the Chronic Care Model stages of case management and self-management support. The blueprint demonstrated the transferal in client's role from a patient to an active member of the society who has a chronic illness and a person who is willing to participate in developing the service. The blueprint exemplified the user actions and touch points especially the amendment of the interaction between the client and health care professional and the alteration from planned visits to client's self-care, self-control and self-service.

The findings propounded the importance of the change management in the health care organization. The eHealth services made changes to the care process and generated new requirements to the employees and the health providers and organizations. Tronto (2010, 168) pointed out the necessity of making explicit arrangements to resolve these conflicts in the organization. The client's freedom to choose the service channel and take an active role as well as the eHealth and client-centric care seemed to change and shift the professional role of physicians and nurses from the traditional authority and responsibility axis. The professionals have to let the clients take responsibility for their care and at the same time find new ways to support the client with less authority. These findings were consistent with Juujärvi, Myyry & Pesso (2007, 44-48).

The new service model digitalized the care of type 1 diabetes care. The digitalized service has to be utilized by individuals and organizations and it has to be embedded in processes of the service and to be relied upon as a public service as Callorda, Katz & Koutroumpis (2014, 32-33, 42-43) pointed out in their article. The new service model was client-driven and it digitized the client's self-care and interaction between the client and multi-professional team. The service was utilized by individuals, care providers and other actors of the service. eHealth was embedded in the service process and relied upon by all users of the service.

7.1 Ethical Issues

The research permission was requested from the Satakunta Hospital District on the 26th of February 2014. Permission was granted on the 6th of March 2014.

The aim of the study and the participants' role were explained in the letter of consent (in Finnish) Appendix 2. In the letter the members were informed of the workshops and that their faces are recognizable in the photos. The experts with experience were presented in this study anonymously, only gender, age and in a common way their diabetes treatment was published. All participants gave permission to publish the photos in this study. The participants signed the letter of consent voluntarily. All participants represented themselves in the co-creation workshops. (Brinkman & Kvale 2009, 70-72: Erikson & Kovalainen 2008, 70-72; Hirsjärvi et al. 2001, 26-27).

The researcher respected the human values, life, self-determination, privacy and confidentiality of personal information of the focus group (World Medical Association 2013). All the medical issues discussed and revealed in the workshops were held as patient information. The video recordings were only for the study purpose. The further use of the video recordings was left to be decided by the focus groups and the Satakunta District Hospital. The video recordings would be archived by the district hospital or they would be destroyed.

7.2 Trustworthiness

The CoCo Cosmos play was considered as a reliable and suitable tool to be used in this study. The CoCo Tool Kit and CoCo Cosmos were designed in a research project with Laurea University of Applied Sciences together in partnership with VTT Technical Research Centre Finland and the University of Cambridge (Laurea 2013). The research project was published in the conference proceedings of the second Cambridge Academic Design Management Conference in September 2013 (Dusch et al. 2013a, 153).

The workshop stages were based on a commonly used procedure described in literature (Mattelmäki & Vaajakallio 2011, 81). The workshops were documented in photographs, research notes and in video recording. Both focus groups worked separately in two workshops. This created a comfortable situation for the participants to discuss the current state and new service models.

In the third workshop (fifth CoCo Cosmos play) the two focus groups worked together. The participants were members of their community, customers of the health service and the multi-professional care team members were representatives of their profession. They were not used to work together in a workshop and some shyness was noticed. The researcher was aware of the relationship between the two focus groups as being clients and service providers, but finding a common time was challenging. The situation was accounted for in earlier studies (Guba & Lincoln 2005, 206-209). Working separately in the third workshop might have captured more information about the customer experience.

In this study the data was collected in co-creation workshops with CoCo Cosmos tool and was documented faithfully. The CoCo Cosmos play was distinguished as an empirical and semi-structured data collection method. The workshops resembled a group interview like brainstorming when the participants shared their experience and co-created the new service model (Fontana & Frey 2005, 703-705). The researcher was acting as a facilitator in the groups and did not interfere in the play. The co-creation workshops created a positive social change and an emancipatory community action.

The photographs visually represented the outcome of the CoCo Cosmos play and were the primary data. The secondary data was research notes and video recordings and it supported the primary data. The visual data is generally treated and analyzed as a direct representation of reality and it is considered as true and objective material (Harper 2005, 748-749, 756). In this study the participants decided when the CoCo Cosmos play was ready and the picture was taken after the note. The researcher did not influence the visual data. (Erikson & Kovalainen 2008, 77-81, 91-93; Guba & Lincoln 2005, 195-196, 204, 207).

The photo elicitation was the primary method in 40 studies where the common purpose was to understand the world as defined by the subject (Harper 2005, 756-757). In this study the collected data, the photographs of CoCo Cosmos play, were analyzed and recorded in the same way as an interview or any other qualitative data would be. The photographs were analyzed individually in parts as fragments of the service and then copared in pairs the client' and professional's plays of the current state and the new service model. The analysis was completed to understand the service as it had been defined in the CoCo Cosmos play.

Data source triangulation was used to clarify the content of the data and to minimize the researcher's bias in the analysis process (Erikson & Kovalainen 2008, 292-293). The deductive content analyze was based on the theoretical concepts as the Chronic Care Model and the Service offering in understanding and interpreting the findings of the study and to minimize the researchers bias in the analysis process. The researcher was working with discipline and documented the deductive content analyze. The visual data analysis and transcription process reflected, and respected the complexity of social organization. The data analysis focused on the interaction between the actors and the service model as a holistic and complex entity. (Atkinson & Delamont 2005, 835-836; Erikson & Kovalainen 2008, 21-22, 292-293; Harper 2005, 748-749).

The data collection method was new to the researcher. Designing, facilitating the co-creation workshops and using the CoCo Cosmos play were an interesting process. The researcher respected the readiness of the development process. In this study the action research aimed to develop a holistic understanding of the current state and new service model. (Coughlan & Coghlan 2002; Erikson & Kovalainen, 2008, 65). The researcher was aware of being bias when acting as a facilitator and she did not interfere to the CoCo Cosmos plays unless the participants asked technical questions. The researcher respected the participant's voice and their problem-solving activity in the CoCo Cosmos play while transcribing the data, categorizing and analyzing the content deductively. (Erikson & Kovalainen 2008, 21-22; Järvinen & Järvinen 2011, 130; Marshall, Willson, de Salas & McKay 2010). The action research project was a positive learning experience (Guba & Lincoln 2005, 207, 210).

This study was an interesting and rousing process. The researcher performed the study in her free-time in order to have researcher's freedom and to avoid external efect on the study. The participants were inspiring in the workshops and this study would not have been possible without their contribution. The analysis period was the most challenging part of the study. The researcher was humble in front of the amount of collected data where only the photographs of the CoCo Cosmos play were analyzed and a blueprint was made. Although the data source triangulation and deductive content analysis process were based on several perspectives and stages, the data become familiar and the researcher felt she could be biased to the data analysis process.

7.3 Future Challenges

The digitalized chronic care can be implemented to the type 1 diabetes care in a similar approach as the eBanking services were deployed in Finland. The motivation on the use of eServices, communication of the benefits and personal support on an assignation fostered the customer relationship. In the banking industry the employees understood the online services

changed their job description to become more interesting, customer-related work and the employers saw the cost-saving potential as Enders et al. (2006, 67-77) outlined in their study. The digitalized service meets the challenges of an increasing number of diabetes patients vs a decreasing number of healthcare providers due to retirement as the year 2020 approaches and the service can be seen as a means of maintaining a consistent approach and quality of service for type 1 diabetes patients in the near future.

The findings indicate the client-centric service model can be adapted for other non-communicable diseases. The blueprint visualized the complex service offering with several actors from different organizations. The service phases of the blueprint can be analyzed one by one to clarify the tasks and responsibilities of the actors and to gain a deeper understanding of service experience.

The findings and the blueprint promoted the transition phase where the client was migrated from self-management support to independent self-care. An interesting further research question would be to elaborate the service phases and to develop tools to identify the client engagement and confidence on self-care. Another research question would be to contemplate the quality of care and self-care.

The digitalized service makes changes to the customer interaction, professional's job description and workload as well as client's everyday life and self-care. For the further research a change management process plan and the effectiveness and cost reductions analysis of the digitalized service would be beneficial to identify as well as how the digitized service affects the economics.

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Figures

Tables

Appendices

Appendix 1. eHealth Implementations and Projects in Finland

eHealth Implementations and Projects in Finland

In the following table some interesting eHealth implementations and projects in Finland are presented. These projects have been implementing Chronic Care Model, diabetes self-care or combined eHealth to health processes.

Care4Me The Care4Me project developed and studied the PHR, remote monitoring and decision support tool for patients. The research findings presented that the PHR, remote monitoring and decision support tool and evidence-based automated health coaching have a potential influence on type 2 diabetes care results. (Ficher, Harno, Kaijanranta, Kulju, Leppänen, Lähteenmäki, Orasmaa, Salaspuro Schachner, Stenger & Wintergrest 2013).
Coper –project The Coper project was a subproject of the Pump project implemented in the Turku region. The Coper project investigated the needs of patients with a cardiovascular illness in relation to eHealth services. The main results were a need for information related to their illness, communication as well as participating in the decision making of his health and care plan, social support from his family members and self-care. (Knaapila-Junnila, Korpela, Koskinen & Otim 2013, 8-9).
eKat Project From the year 2007 to 2009 the eKat project was a nationally coordinated pilot eHealth project. The name of the project was an abbreviation of “electronic citizen’s health”. It combined five different eHealth projects under the same umbrella. The subprojects had their own focus to develop ebooking, messaging, patient portal with a diary and evidence based health information portal. The eKat project coordinated the national definition work and shared the good practices from the projects. The results from all of the subprojects were positive. (Koski, Niska & Valkeakari 2009, 4-12, 53, 58).

eMedic

The eMedic project was a cross-border project in four countries around the Baltic sea. The project focused on developing new practices for teleconsultation, technological applications and monitoring tools for diabetes and pediatric care. Each country had a different project angle to the subject. In the Western Finland region the project focused on teleconsultation and remote monitoring in diabetes care. The eMedic was evaluated with a Model for Assessment of Telemedicine (MAST). (Jani 2012, 10, 12). The eMedic project lasted until April 2014.

The Latvian project presented the eMedic project's experiences in a conference. The preliminary result showed the applied techniques can improve quality of care, but the education on how to use the new technical devices and solutions as well as the testing of the devices, data input and output is crucial. (Dekante, Fokina, Gailiša, Gaišuta, Geldnere, Grīnšteine, Pīrāgs, Sokolovska, Stibe, Vaivode, Vītola & Zariņa 2013).

Kurkiaura

The Kurkiaura ongoing project aims to create new service business for seamless health and social care where public, private and the third sector build together added value for the client. The aim of the project is to develop a service innovation and to define a PHR with communicational tools. The PHR is integrated into the local EHR and the national eAchive database. (Leimumäki & Päräkkä 2012, 39).

Oulun Omahoito

The city of Oulu offers a personal health record, Oulun Omahoito, to all city residents. The Oulun Omahoito has functionalities such as scheduling, secured messaging and questionnaires in addition to the PHR functionalities. The development of Oulun Omahoito started in a project in 2007 (Hirvasniemi & Kanto, 2009, 4). The concept development continued in the eKat project (Koski, Niska & Valkeakari, 2009,). In the year 2012 the Oulun Omahoito expanded to cover the health, dental as well as social care in the city of Oulu. The number of registered users has tripled in a year, from 20623 users in the year 2012 to 42000 users in the year 2013. (Oulun kaupungin tilinpäätös ja toimintakertomus 2012, 75; Nordic Healthcare Group 2013, 9).

Renewing Health

Renewing Health was an European project in nine countries concentrated on three chronic diseases: cardiovascular disease, COPD and diabetes. The focus of the project was to implement large-scale innovative telemedicine services using a patient-centred approach and evaluate and validate them with an assessment methodology like Model for Assessment of Telemedicine (MAST). The Renewing Health project had 10 clusters with 21 pilot projects and around 7000 patients. Twenty of the projects were performed as randomized controlled parallel-group unblinded trials and the final one as an observational trial. The Renewing Health services were designed to give participants a central role in the management of their disease as well as to provide healthcare professionals with new tools for collaboration and communication. In Finland the South Karelia District of Social and Health Services participated in Renewing health. The Finnish subproject focused on evaluating the effects on health coaching combined with tele-monitoring. The research focused on type 2 diabetes and cardio vascular disease patients. (Renewing health). The pilots showed from the clinical point of view the interventions were equal to usual care, well received by participants, but were not regarded as a replacement for the usual care. The primary outcomes of the pilot projects presented a trend for improvement in quality of life, but the trend was not statistically significant. The results for diabetes demonstrated a constant trend for reduction of the HbA1c and a lower number of outpatient visits. (Andersen, Aletras, d'Angelantonio, Dafaulas, Fasterholdt, Jensen, Kidholm, Kotzeva, Lange, Lindberg, Mancin, Pedersen, Ribu, Scharf, Stafylas & Wanscher C. 2014, 2, 10, 37-40).

Pump (Pumppu in Finnish)

Pump project was a citizen-centric health and wellness multi-producer project. It combined several subprojects of the same theme of developing a multi-producer approach in the health and wellness sector. The project focused on developing new models for a citizen-centric approach of seamless care processes. (Pumppu n.d.).

United4Health

The United4Health program continues the implementation and validation of telehealth solutions. The services are selected from the large range of clinically validated services used in the Renewing health project. The Unite4Health program aims to increase the use of telemedicine in Europe. The telehealth services are designed for diabetes, COPD or cardiovascular diseases. The approach supports chronic care model. The program is ongoing until December 2015. (Europe's Information Society 2013).

SADe

The Action Program on eServices and eDemocracy (SADe) was launched by the Ministry of Finance in 2008. The health and social care services project aims to develop online services for citizens to maintain and monitor their personal health and well-being. (Ministry of Finance 2013, 2, 5). The health and social care services projects have three subprojects. The national electronic service voucher and purchasing service for citizens (acronym PSOP). Mental Health Center (Mielenterveystalo) was developed at HUS - The Hospital District of Helsinki and Uusimaa. In the SADe project the Mental Health Center will be implemented nationally. The Hyvis-SADe project aims to develop regional eHealth solutions for treatment needs, assessment, secured messaging and scheduling services. (National Institute for Health and Welfare 2014).

Appendix 2. The Letter of Consent

The Letter of Consent

Tule kehittämään uudenlaista diabeteksen palvelumallia

Sähköinen asiointi on monessa kunnassa ja sairaanhoitopiirissä on mahdollistanut uudenlaisen toiminnan, jossa potilas voi täyttää verkossa perinteiset paperiset lomakkeet, kuten esitiedot. Kuntien omahoitoratkaisut mahdollistavat potilaan omahoitoon liittyvien mittausten, päiväkirjan ja kyselyiden vastausten lukemisen jo ennen vastaanottokäyntiä. Asiakkaat ovat ottaneet omahoitoratkaisuja maltillisesti käyttöönsä.

Kela, pankit ja verottaja ovat muuttaneet toimintamallejaan ja siirtäneet palvelut verkkoon. Asiakas voi valita asiointikanavan; verkossa, puhelimessa tai vastaanottokäynnillä. Pankit mallinsivat, suunnittelivat ja ottivat verkkoasioinnin käyttöönsä jo 1990-lopulla. Työntekijöiden työn todettiin muuttuneen asiakaslähtöiseksi, kun tapaamisessa käsiteltiin heidän ongelmiaan eikä suoritettu rutiinitehtäviä.

Osallistu uuden tyypin 1 diabeteksen palvelumallin kehittämistyöpajoihin huhti-toukokuussa 2014.

Kehittämistyö toteutetaan palvelumuotoilun työpajassa yhteiskehittämisellä (co-creation). Työkaluna käytetään CoCo Kosmos peliä. Peli on kehitetty Laurea ammattikorkeakoulussa yhteistyössä University of Cambridge:n ja VTT:n kanssa.

Kehittämistyöpajoja on yhteensä kolme: yksi moni-ammatillisen hoitotiimin jäsenten kesken, yksi diabeetikkojen, jotka ovat oma sairautensa kokemusasiantuntijoita ja yksi yhteinen työpaja, jossa käsitellään molempien työpajojen CoCo Kosmos peleistä yhdistettyä palvelumallia sekä keskustellaan siitä. Työpajojen kesto on arviolta 2-3 tuntia. Työpajat järjestetään Satakunnan keskussairaalan neuvotteluhuoneessa tai vastaavassa rauhallisessa huoneessa. Pelilaudasta otetaan kuvia ja työpajat videoidaan. Videoita käytetään vain taustamateriaalina kuvien tulkinnassa.

Kuvat ovat CoCo Työkalupakin esittelysivuilta http://www.laurea.fi/en/cocotoolkit/Pages/default.aspx.

Kehittämistyöstä on sovittu hallinnollisen ylihoitajan Paula Asikaisen ja diabeteshoitaja Marja Rautavirran kanssa. Heidän kanssa on käyty ideointia diabeteksen uudesta palvelumallista, jossa sähköinen asiointi on asiakkaan ja moni-ammatillisen hoitotiimin yhteinen verkkopalvelu.
Työpajojen vetäjänä toimii Hanna Iisalo, jolla on yli 10 vuoden kokemus terveydenhuollon sähköisistä asiointiratkaisuista ja opiskelee Master of Healthcare ohjelmassa Laureassa oman työ ohella. Palvelumuotoilu ja kehittämistyöpajat ovat osa ylemmän ammattikorkeakoulun opinnäytetyötä.

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Lisätietoja antaa Hanna Iisalo hanna.iisalo@medixine.com

Suostumus

Osallistun vapaaehtoisesti diabeteksen uuden palvelumallin kehittämistyöpajatyöskentelyyn. Työpajatyöskentelyssä edustan itseäni diabeteksen hoidon kokemusasiantuntijana tai moni-ammatillisen hoitotiimin jäsenenä, ammattini edustajana. Osallistuminen ei vaadi muuta kuin kiinnostuksen palvelumallin kehittämiseen.
Työpajatyöskentelyn aikana otetaan valokuvia pelilaudasta ja työpajatyöskentelystä. Kuvissa näkyy henkilöiden kasvot. Kuvat liitetään opinnäytetyöhön, joka on julkinen dokumentti. Työpajatyöskentely videoidaan, joita käytetään taustamateriaalina kuvien tulkinnassa. Videoita ei liitetä opinnäytetyöhön.

Suostun työpajatyöskentelyyn ja valokuvien julkaisemiseen osana opinnäytetyötä.

Porissa _____._____ 2014

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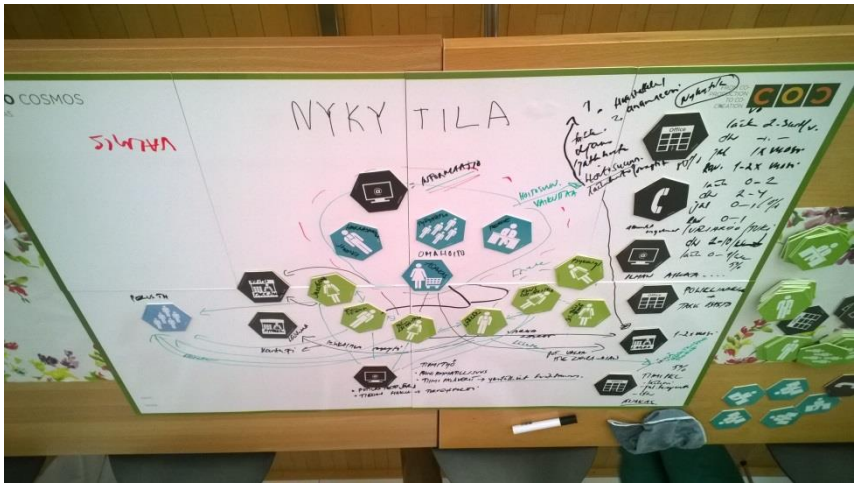
Appendix 3. Preliminary Findings

Preliminary Findings

Preliminary findings were presented in the third workshop on the 13th of June 2014.

Professionals WS 1/1

Present model



- Chronic care model
- Team work
- Responsibilities

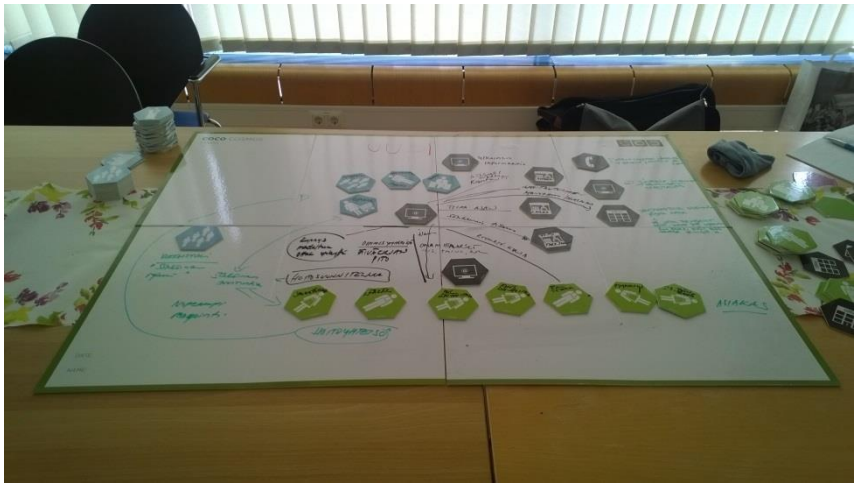
Experts with Experience WS 2/1

Present model

- Customer's role as a care coordinator
- Chronic Care
- Everyday life

Professionals WS ½

New service model



- Client and care team form one care community
- Client chooses the time and channel for communication
- Services channels differentiate
- Personalization
- Accessibility for the service is better
- The importance of the accurate information and a learning environment is growing

Experts with Experience WS 2/2

New service model

- ”Omahoidon tukijärjestelmä”
- Client is a user and provider of the service
- Competence develops
- Self-care, directed self-care
- Client is confident
- The service channels differs
- The importance of information is growing
- Internet is full of information
- Peer support

Appendix 4. Photographs of The CoCo Cosmos Plays

Photographs Taken of the CoCo Cosmos Plays in the Workshops

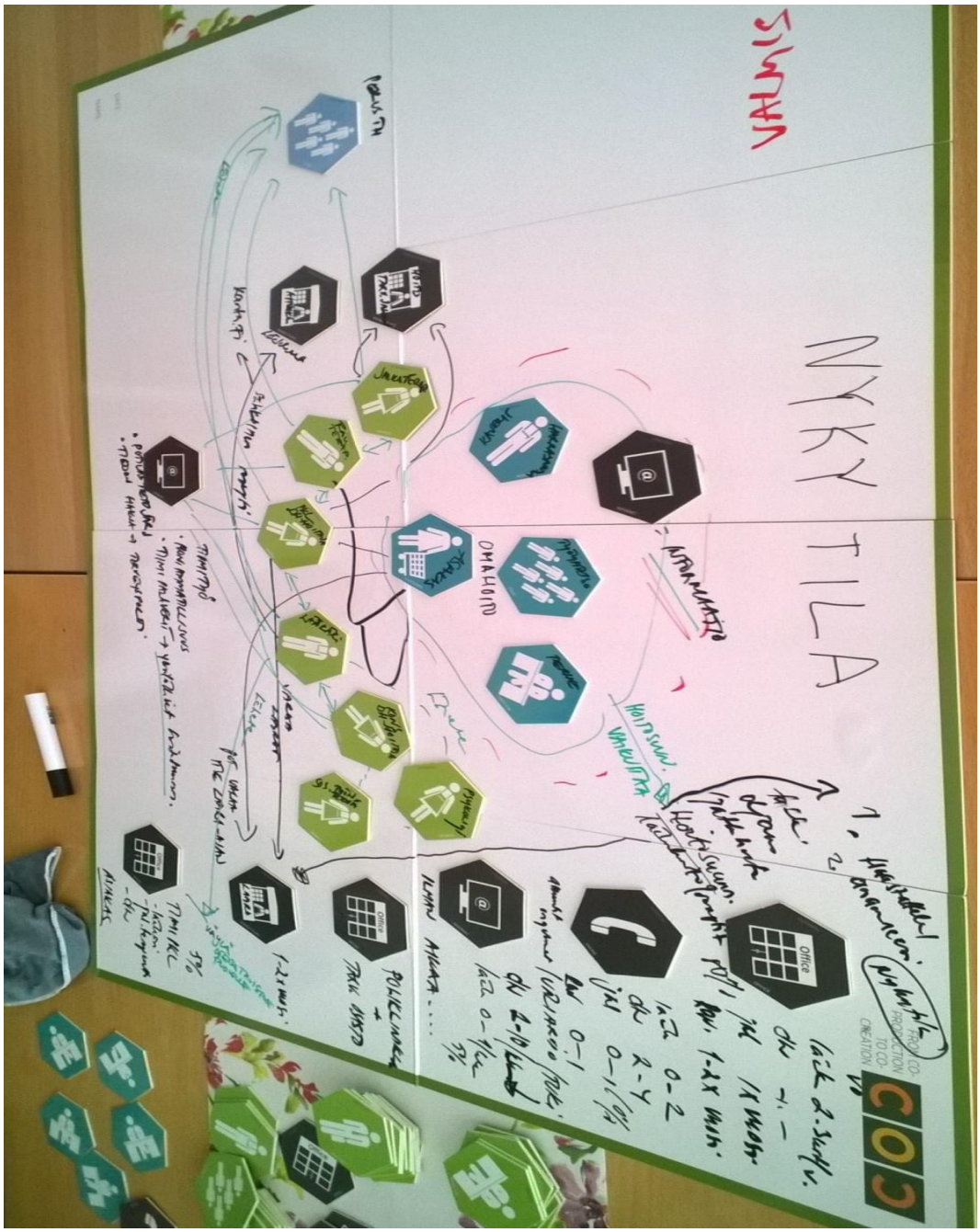


Photo 1. The present service model by multi-professional team.
Workshop 1, the 1. CoCo Cosmos play.

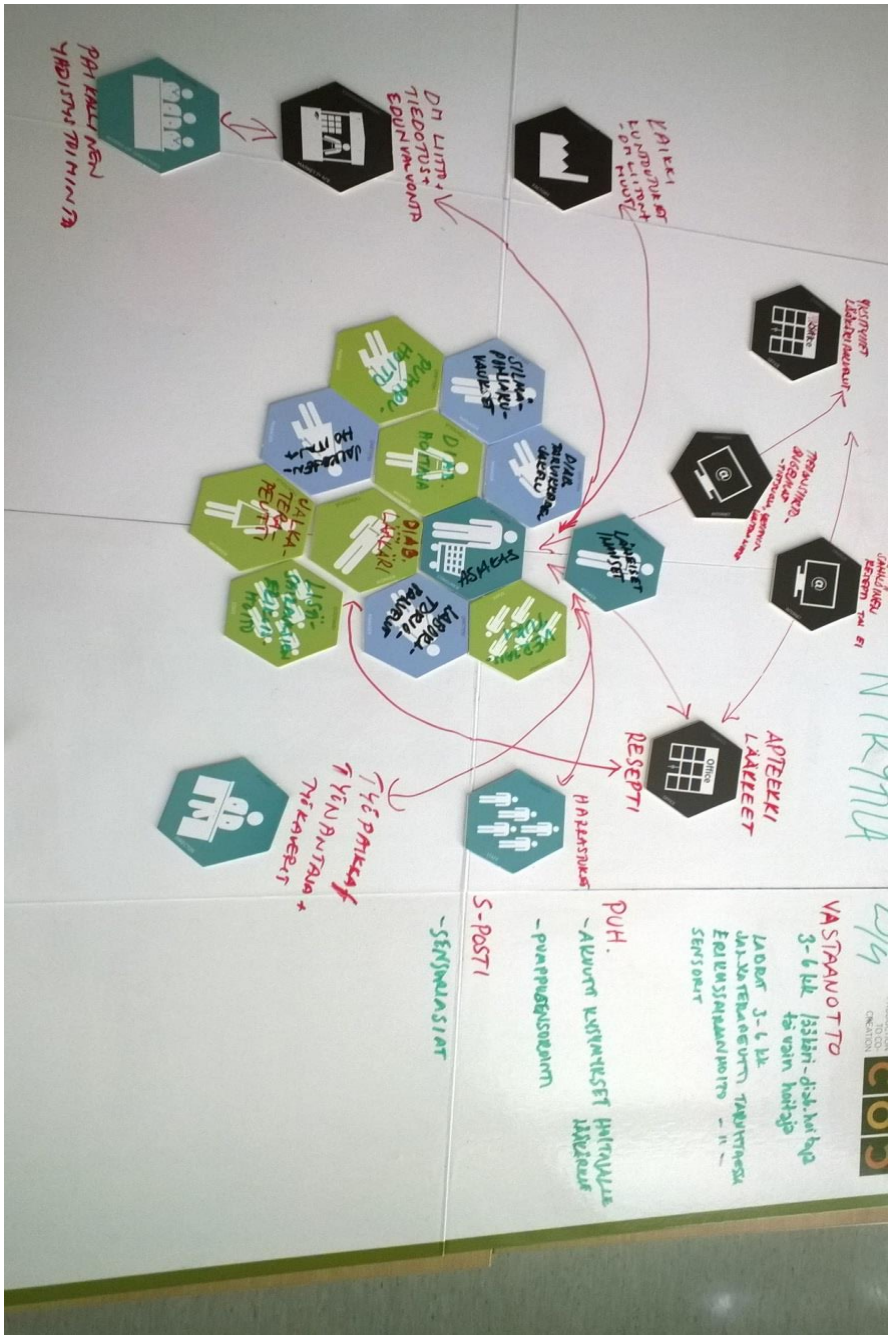


Photo 2. The present service model by the groups of experts of experience. Workshop 2, the 1. CoCo Cosmos play.

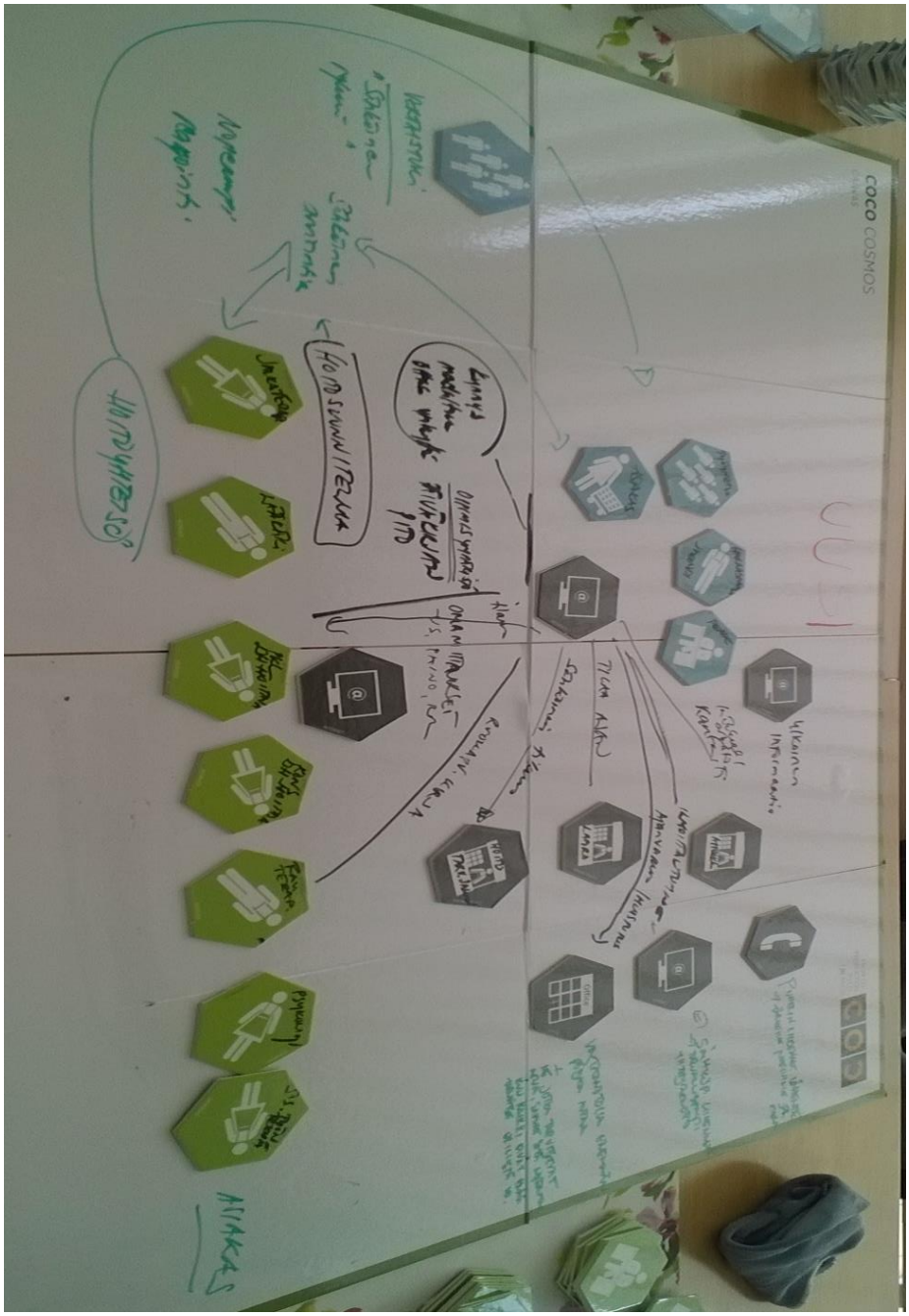


Photo 3. The new service model by multi-professional team.

Workshop 1, the 2. CoCo Cosmos play.

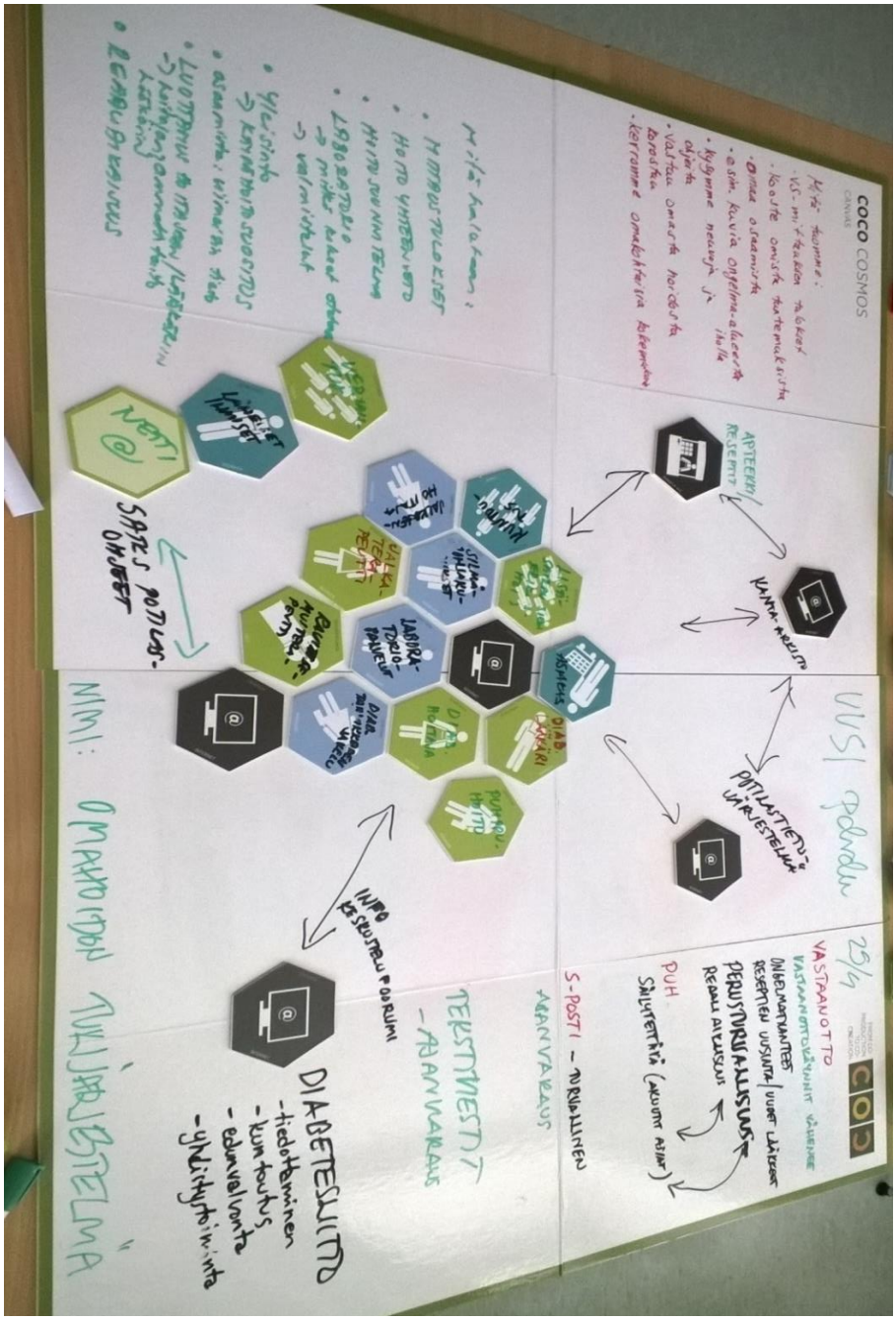


Photo 4. The new service model by the groups of experts of experience. Workshop 2, the 2. CoCo Cosmos play.

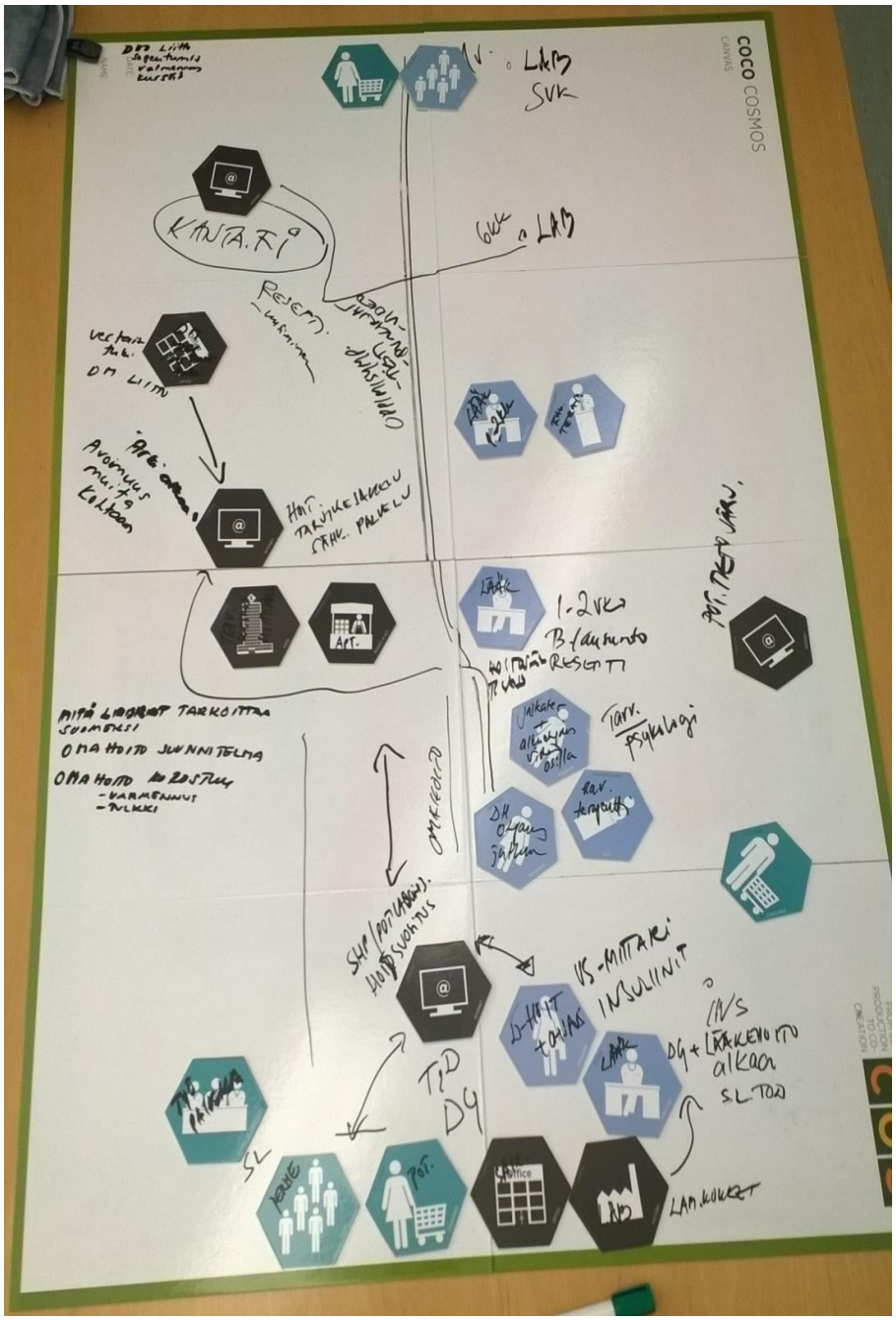


Photo 5. The blueprint of the new service model.

Workshop 3, the group of experts of experience and multi-professional team.

Appendix 5. Blueprint Final

Blueprint Final

The blueprint was originally designed as a Microsoft Excel worksheet.

The blueprint is divided to four separate blueprints:

Service Phases and Activities

		Customer seeks for care / Diagnose					
		Health care servcie profider (HCSP)			Regional HCSP	Other actors	Backstage
		Face-to-face	Phone	eHealth	Face-to-face	Face-to-face	
Customer	Customer	Has a referral from occupational health care. Comes to the outpatient ward. Meets physician and nurse.	Sudden problems: nurse, physician	Registration to the eHealth	Visits Lab, Pharmacy	Explains, answers questions to family members. Supported by his/hers family	Read information on the internet, Finnish Diabetes Association
Health care servcie provicer	Diabetes physician	Examination and diagnose, referrals, prescription, sick leave certificate	Answers clients questions on phone				EHR, LIS, ePrescription, Kanta
	Diabetes nurse	Guidance, teaches the use of blood sugar meter,orders medical supplies. Makes the voucher for distribution center.	Answers clients questions on phone	Registration and coaches the use of eHealth			EHR, eDistribution, Kanta
	Dietitian						
	Podiatrician						
	Psychologist						
	Social worker						
	Specialist - additional illnesses						
Regional health provider	Laboratory				Lab tests and analysis		LIS
	Pharmacy				Medication distribution		ePrescription
	Medical supplies distribution				Distribution center receives the voucher		EHR 2, Kanta, eDistribution
	Fundus imagining						
	Occupational health care						
	Pedicurist						
Other actors	Family members					Are worried, ask questions, try to help	Read articles on the Internet
	Employer					Receives the sick leave certificate	
	Workmates						
	Hobby						
	Peer-support groups						
	Finnish Diabetes Association						
	Rehabilitation						
Backstage	EHR	x					
	LIS				x		
	ePrescritpion	x			x		
	eArchive (Kanta)				x		
	eLearning environement						
	eDistribution	x			x		
	The Internet	x			x	x	
	The facilites	x	x		x	x	

Blueprint 1. Customer seeks for care / Diagnose.

Service Phases and Activities

		Learning self-care of chronic illness / Case Management (1-2 weeks to 3 months, personal)					
		Health care servcie profider (HCSP)			Regional HCSP	Other actors	Backstage
		Face-to-face	Phone	eHealth	Face-to-face	Face-to-face	
Customer	Customer	Client has several planned visits and tasks: Physician, nurse, dietician, podiatrist	Calls and ask if sudden problems: nurse, physician	Read information, learn, measure, fill-in questionnaires, follow-up, ask for support, see lab results and interpretation and book planned visits. Makes an order for supplies. Gives permission to the occupational HCP to use eHealth.	Goes to lab for tests, pharmacy for medication. Registeres to the eDistribution. Goes to distribution center for supplies. Visits the occupational health provider.	Explains, answers questions to family members. They are supporting client. Returns to work, answers workmates questions.	Read information on the internet, Duodecim, Finnish Diabetes Association, visits Peer support groups
Health care service provicer	Diabetes physician	Health and care plan, normal care path check-up, signs referrals, builds up trust and customer relationship	Answers clients questions on phone	Health and care plan published, answers questions			Duodecim information, decision support , EHR, LIS, ePrescription, Kanta,
	Diabetes nurse	Care coordinator, normal care path check-up, Guidance, insuline treatment, teaches the use of blood sugar meter,orders medical supplies, builds up trust and customer relationship	Answers clients questions on phone	Guidance, answers questions, follow-up and support the client self-care			Duodecim information, Decision support , EHR, LIS, ePrescription, Kanta,
	Dietitian	guidance, carbohydrates		instructions, follow-up diet diary			EHR, Decision support on the Internet
	Podiatrician	guidance, feet					EHR, Decision support on the Internet
	Psychologist	On demand					EHR, Decision support on the Internet
	Social worker	On demand					EHR, Decision support on the Internet
	Specialist - additional illnesses	On demand					EHR, Decision support on the Internet
Regional health provider	Laboratory			laboratory results and interpretation	lab test and analysis		LIS
	Pharmacy				Medication distribution, information		ePrescription, Decision support on the Internet
	Medical supplies distribution			Receives client's order. Deliver the supplies to the client.			EHR 2, Kanta, eDistribution, Decision support
	Fundus imagining						
	Occupational health care			Can read and comment customers notes	Planned appointment		EHR 3, Kanta, Decision support on the Internet
	Pedicurist						
Other actors	Family members					supports, ask questions, try to help	Read articles on the Internet
	Employer					Worker returns, possible extra arrangements	
	Workmates					Ask questions	Read articles on the Internet
	Hobby						
	Peer-support groups						Peer-support groups
	Finnish Diabetes Association						Information
	Rehabilitation						
Backstage	EHR	x					
	LIS	x			x		
	ePrescritpion	x			x		
	eArchive (Kanta)	x			x		
	eLearning environement						
	eDistribution	x			x		
	The Internet	x			x	x	
	The facilites	x	x		x	x	

Blueprint 2. Learning self-care of chronic illness / Case Management (1-2 weeks to 3 months, personal).

Service Phases and Activities

		Confident on self-care / Self-management support (3 to 6 months from personal needs)					
		Health care servcie profider (HCSP)			Regional HCSP	Other actors	Backstage
		Face-to-face	Phone	eHealth	Face-to-face	Face-to-face	
Customer	Customer	Planned visits if client needs: Physician, nurse, dietician, podiatrist	Sudden problems: nurse, physician	Read and use the eLearning. Becomes a confident on self-care. Coordinates his/hers self-care. Produces information. Read, learn, measures, follow-up, asks for support online. Knows and trust on multi-professional care team	Goes to lab for tests, pharmacy for medication and distribution center for supplies	Local Diabetes associations meetings and peer support	Finnish Diabetes Association information and peer-support. Reliable and unreliable information online.
Health care service provicer	Diabetes physician	Planned visits, client's self-management support	On clients demand	Interaction and follow-up. Approve clients own health and care plan and discuss if necessary			Duodecim information, decision support , Analyze information on Internet to personalize it to client, EHR, LIS, ePrescription, Kanta,
	Diabetes nurse	Planned visits, client's self-management support	On clients demand	Coaching, interaction and follow-up. Support eLearning. Customer relationship. Approve clients own health and care plan and discuss if necessary.			Duodecim information, Decision support , eLearning, eDistribution, Analyze information on Internet to personalize it to client, EHR, LIS, Kanta
	Dietitian			on clients demand. Answers client's questions.			EHR, Decision support on the Internet
	Podiatrician			on clients demand			EHR, Decision support on the Internet
	Psychologist			on clients demand			EHR, Decision support on the Internet
	Social worker			on clients demand			EHR, Decision support on the Internet
	Specialist - additional illnesses	on demand					EHR, Decision support on the Internet
Regional health provider	Laboratory			Lab results and interpretation	lab test and analysis		LIS
	Pharmacy				Medication distribution, information		ePrescritpion
	Medical supplies distribution				Receive and deliver client's orders		EHR 2, eDistribution, Kanta
	Fundus imagining						
	Occupational health care			Can read and comment customers notes	on demand		EHR 2, Kanta
	Pedicurist						
Other actors	Family members					Normal routines	
	Employer					Normal routines	
	Workmates					Normal routines	
	Hobby					Ask questions	Read articles on the Internet
	Peer-support groups					Local diabetes associations meetings	Peer-support groups
	Finnish Diabetes Association					Local diabetes associations meetings	Information on the Internet
	Rehabilitation						
Backstage	EHR	x					
	UIS	x			x		
	ePrescritpion	x			x		
	eArchive (Kanta)	x			x		
	eLearning environement	x					
	eDistribution	x			x		
	The Internet	x			x	x	
	The facilites	x	x		x	x	

Blueprint 3. Confident on self-care / Self-management support (3 to 6 months from personal needs).

Service Phases and Activities								
		Motivated service user / Customer relationship management (6 monts up to lifetime, from personal needs)						
		Health care servcie profider (HCSP)			Regional HCSP	Other actors	Backstage	
		Face-to-face	Phone	eHealth	Face-to-face	Face-to-face		
Customer	Customer	Empowered and engaged client. Client decides the channel he/she uses. Planned visits on demand.	On demand, client decides	Empowered and engaged client. Coordinates his/hers self-care. Takes care of his/hers self-care and is responsible of it. Follow up his/her wellbeeing. The solution provides personal feedback. Asks support on demand. Visits eLearning site on demand.	Goes to lab for tests, pharmacy for medication and distribution center for supplies	Local diabetes association meetings. Applies for an adaptation and rehabilitation course. Attends to rehab course.	Peer-support group. Continues to meet the other course participants online. Information online.	
Health care service provicer	Diabetes physician	On clients demand	On clients demand	On clients demand, secured communication.			Analyze information on Internet to personalize it to client,EHR, LIS, RIS, ePrescription, Kanta	
	Diabetes nurse	On clients demand	On clients demand	Coaching. Customer relationship. eHealth services automatically follow-up and signals to nurse.			Analyze information on Internet to personalize it to client, EHR, eDistribution, eLearning, Kanta	
	Dietitian			On clients demand			EHR, Analyze information on Internet to personalize it to client	
	Podiatrician			On clients demand			EHR, Analyze information on Internet to personalize it to client	
	Psychologist							
	Social worker							
	Specialist - additional illnesses			on demand			EHR, Kanta, ePrescription	
Regional health provider	Laboratory			Lab results and interpretation	lab test and analysis		LIS	
	Pharmacy				Medication distribution, information		ePrescription	
	Medical supplies distribution				client orders and collects		eDistribution,EHR 2, Kanta	
	Fundus imagining				on demand fundus imagining and analysis		RIS	
	Occupational health care			Can read and comment customers notes	on demand		EHR 3, Kanta, ePrescription	
	Pedicurist				on clients demand			
Other actors	Family members					Normal routines		
	Employer					Normal routines		
	Workmates					Normal routines		
	Hobby					Normal routines		
	Peer-support groups						Peer-support groups	
	Finnish Diabetes Association					Local diabetes associations meetings		
	Rehabilitation					Finnish Diabetes association organize adaptation and rehabilitation courses		
Backstage	EHR	x						
	LIS	x			x			
	ePrescritpion	x			x			
	eArchive (Kanta)	x			x			
	eLearning environement	x						
	eDistribution	x			x			
	The Internet	x				x		
	The facilites	x	x		x	x		

Blueprint 4. Motivated service user / Customer relationship management (6 months up to lifetime, from personal needs).